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THE modification of the McKinley tariff in the direction of lower rates appears to be advocated by nearly all the Republican papers, and the opinion seems to prevail that the party will do well to "steal the Democrats' thunder" by reducing the burthensome features of the McKinley bill at the next session of Congress before the Democrats come in power.

In other words, what the ENGINEERING AND MINING JOURNAL has constantly asserted, when its assertion was unpopular, is now generally admitted, namely, that the friends of legitimate protection are those who moderate its claims to the limits of what is necessary and fair and just, and the worst enemies of protection are those who make extravagant demands from selfish motives and tax the whole country outrageously in order to make a few rich men richer yet.

The aluminum question appears to be uppermost in the metallurgical world to-day; for from all sides come reports of new processes for its manufacture. We make no reference here to the humbugs, such as the Hartsfeld, Newport, Ky., concern, or to the fabulous Chicago pretentions. We have, however, learned from thoroughly reliable sources the particulars of the experimental manufacture of pure aluminum in a manner which certainly promises to produce the metal with hitherto unapproachable economy. We learn also of great progress having recently been made in imparting new properties to the metal when made. Aluminum "as hard as steel and as strong as iron" is one of these new products.

## CO-OPERATIVE MINE DRAINAGE.

The difficulties that have to be encountered in one of the colliery districts of England in dealing with large bodies of water are perhaps unparalleled in this country, and the way in which these difficulties are overcome is instructive. The South Staffordshire district, to which we refer, has for 17 years placed the control of its drainage in the hands of a Drainage Commission with legal powers which fixes rates payable by all the collieries benefited, and with the aid of the best engineering advice obtainable applies the sum produced by the rates to a comprehensive and scientific system of drainage for the whole district. The necessary capital for the work to be done and the installation of the pumping plants is borrowed on the security of the rates at a moderate interest, and the repayment of the money borrowed is also provided for by a sinking fund from the same source. The work already done in this way has been productive of results which could not have been obtained by individual efforts, as may be judged from the fact that in the report recently presented to the Commissioners by the manager and chief engineer, Mr. EDMUND HOWL, it is stated that the average amount of water raised daily in the district for the last three years has been 12,000,000 imperial gallons (or 14,400,000 American gallons). Of this amount 10,000,000 gallons has been raised by the Commissioners and 2,000,000 gallons by independent work. Gigantic as this amount appears, these efforts only suffice to keep the water stationary at about a certain level and the amount of coal to be gained above that level is steadily being reduced so much that in some subdivisions of the district there would be a dead loss on every ton of coal raised if it had to bear its fair proportion of the cost of pumping. The cost of pumping in the most favorable subdivision of the district, where the largest amount of coal is now being mined, is 4·68 cents per ton of coal raised. The Commissioners seem to have exhausted their legal powers with regard to raising capital, but at the suggestion of their Chief Engineer they are now negotiating with the colliery proprietors to raise the necessary funds to extend and deepen the scope of their co-operative work. The area embraced in the scheme is 19,250 acres, of which 11,290 acres are coal lands proper, the other 7,960 acres being under towns or so situated as not likely to be worked. Of course the necessary outlay of capital is considerable as more pumps of great capacity and greater power must be put in while many of those now in use will require to be modified, but from the return made by the colliery agents of the amount of unworked coal that will be rendered available by the scheme proposed, the game would be well worth the candle, as, with returns from less than half the area to be benefited, the amount of coal available is 48,000,000.

In many cases in this country such co-operation would be extremely beneficial, not only in coal mining, but in gold and silver mining. We might refer to the Eureka & Richmond mines in Nevada as a case in point where joint action would enable the lower levels of these once valuable mines to be prospected and possibly be made as productive as the upper ground has been.

## AN ENGINEERING OPPORTUNITY AT THE WORLD'S FAIR.—II.

The following remarks are offered as suggestions of what tests should be undertaken:

1. *Fuel Tests.*—Probably no other point in the United States receives such a variety of coal as Chicago, and no other location is so well suited for an exhaustive series of coal tests. The question of the relative value of different coals is a very important one for the whole country, as is the question of what kinds of furnaces are best adapted to develop the maximum heating power of the different varieties. No systematic series of tests of the relative fuel value of different American coals has been undertaken since the experiments of Professor JOHNSON in 1843. His results were defective in that they were confined chiefly to anthracite, and included only one coal mined west of Pittsburg. His furnace was also not adapted to burning bituminous coal. The Chicago Fair will necessarily have a great number of boilers to supply its steam power, besides those that are sent there merely for exhibition. The testing committee might select two or three boilers of standard types, and arrange to have them provided with facilities for rapidly changing their furnaces. These selected boilers might first be supplied with ordinary plain grates, and a ten-hour test made with each one with a number of different coals which are selected as types of the coals mined in different regions. After these tests are completed the furnaces should be changed, and with a number of different kinds of furnaces tests should be made of each furnace with four or five typical varieties of coal, representing wide differences in chemical constitution. Appliances for smoke prevention, automatic stokers, etc., should be tested at the same time, with different coals and varying draft.

2. *Engine Tests.*—The engines to be tested should all be arranged in a

row, and opposite them should be placed one or two lines of shafting, well secured in a strongly-braced supporting structure, and hung in ample and well-lubricated bearings. The shafting should be so arranged that both transmitting and friction dynamometers could be placed in it at any convenient point. Friction brakes should also be provided to be attached to the fly wheels of the engines. One or more large portable boilers should be so arranged as to be connected with short pipes to the engine under test, and the steam used by the engine should be condensed by an independent surface condenser, capable of being worked either under a vacuum or under atmospheric pressure. Tests should be made to show the steam consumption under various conditions of cut-off, load, steam pressure, etc., and the indicated power should be compared with the brake power. A superheating device should also be provided, capable of being connected with the steam pipe, or, in the case of compound engines, with the receivers. The effect of steam jacketing, both with ordinary steam and with superheated steam, should also be determined. The question of the economy of drawing steam from the receiver of a compound engine to heat the feed water should also be determined.

The engines should be divided into classes, as regards both size and type, and experiments should be made to determine not only what type is best for any given set of conditions, but what are the conditions under which each type will give maximum economy of steam, and of total cost of running. Prizes should be numerous in this series of tests, so that the best engine of each type, and of each classified size of that type, might secure a prize, and prizes also should be offered for engines showing any strongly marked individual point of excellence, such as least engine friction, least space occupied, greatest regularity, etc.

3. *Dynamometers, Water and Steam Meters.*—During the engine tests dynamometers, both friction and transmitting, will be needed, and these tests will provide a good opportunity of testing such dynamometers. The long line of shafting being arranged so that dynamometers can be attached at several points, a number of transmitting ones could be used at one time, and the power transmitted finally absorbed by a friction brake or by one of Froude's or Reynolds' dynamometers, such as is used at Owens College in Manchester.

One great desideratum of steam engineers to-day is a reliable steam meter. Prizes should be offered for such meters, and competing ones could be inserted in the steam pipes during the engine tests, and their errors thereby determined. In the same way water meters could be tested as they were used to measure the feed and condensing water, the measurements being, of course, checked by actual weighing.

4. *Transmission of Power.*—Parallel to the long line of shafting there should be another similar line placed at some distance, say 50 feet, and by dynamometers placed on both lines tests could be made of the efficiency of various kinds of belting, rope and wire "drives," etc. Pneumatic transmission of power, as used in Paris, could also be tested by these shafts, one of them furnishing power by belt to the compressors, and the other receiving power from the air motor.

So also electric transmission could be tested. The armature of a dynamo might be mounted on the main shaft and driven directly by it, or it might be driven by a belt. The current could be shunted at will through different lines of wire, insulated in different ways, and finally brought to an electric motor, which should drive the receiving shaft, where the power would be absorbed and measured. A highly important series of tests could be made in this way to determine many points in electrical transmission, on which our knowledge is as yet imperfect, among them being: first, the advantage of driving the armature directly by the power shaft instead of through belting; second, the relative efficiency of large and small dynamos; third, the relative efficiency of different methods of winding, and of different sizes of wire; fourth, the relative efficiency of high and low voltage; fifth, the most economical size of wire for conveying the current long distances.

5. *Tests of Pumps.*—Steam pumping engines could be tested at the same time as steam engines, using a tank on a tower to receive the water pumped. Special experiments should be made to determine not only the form and type of the steam end of the pump which should give the highest efficiency, but also, and independently, the form, dimensions, etc., of water cylinders, chambers, valves, and the speed of motion which would offer least resistance to the passage of the water pumped. These tests should be made on belt-driven pumps as well as steam pumps. In both cases the relation of speed to efficiency should be determined.

Many other desirable tests will suggest themselves to any engineer, but those we have outlined above are sufficient to call attention to the subject and provoke further discussion.

If any such tests are to be carried out the preparation for them should not be left to a group of judges appointed hastily just before the opening of the exhibition, who would be unable to give the proper amount of time to the subject, or to have the apparatus ready in time, so that the whole time the exhibition lasts could be occupied in the tests. An engineering commission should be appointed at an early date, who should consider the whole plan and scope of the tests, decide what tests should be undertaken, how the apparatus to be tested should be located so as to make it convenient for test, and at the same time well arranged for exhibition, and who should nominate the experts to take actual charge of the testing. The appointment of this commission should be made promptly, so that the conditions of the tests could be made public at least a year before the opening of the exhibition, and so give manufacturers of engines and apparatus a fair chance to construct the best apparatus especially suitable for the tests. If the commission should offer sufficient inducements to manufacturers, we have no doubt that many of them would go to great expense to construct the finest engines, etc., that the world has ever seen, and one result of the competition would be an advance in engineering construction, in addition to the advance of knowledge gained by the tests.

## NEW PUBLICATIONS

THE SOUTH APPALACHIAN REGION.—Published by J. A. Maher & Co., Johnson City, Tenn., 1890. Price $5. Scale, five miles to one inch.

Messrs. J. A. Maher & Co., of Johnson City, Tenn., have just published a very complete map of the South Appalachian region, compiled from the maps of the United States Geological Survey. The map is in four sections, each 36 inches square, and on a scale of five miles to the inch. The details on this enormous map are very full, including the number of feet of each elevation above the sea level, mainly in Tennessee, Virginia and North Carolina. It cannot fail to be of service to those interested in this region.

GOLD, GEMS AND PEARLS IN CEYLON AND SOUTHERN INDIA. By A. M. and J. Ferguson. Pages ix, 423, 8vo. Two maps. Second edition. Colombo, Ceylon.

The Messrs. Ferguson, editors of the *Tropical Agriculturist*, have brought together from various sources, largely from the recent press of all countries, such facts as have a direct bearing upon the mining of gold in India, with suggestions as to its possible occurrence in Ceylon, also upon gem-mining in Ceylon and the history of the famous Ceylon pearl fisheries. Nearly the entire volume is an edited compilation from recent newspapers, and being from such modern sources it may lack some of the thoroughness of an old work, but fully nine-tenths of the volume has never been in a book before.

It was not the intention of the authors to make it an important work such as Tennent's or Percival's Ceylon, but rather a volume which a moderate price would place at the command of all. It is a work, however, that cannot fail to be of considerable value.

The complete index is of great assistance in this since the information on any special subject appears under many heads; but the absence of a table of contents is a serious defect.

The two maps lithographed at the Surveyor General's office, Colombo, are excellent. One represents the various gem and gold localities of Ceylon, and the other the pearl banks at the northern end of the island. It is to be regretted, however, that no scale appears on them. The one of the whole island (Map 1) is on a scale of 26 miles to the inch. The one of the pearl banks is 18 miles to the inch.

In the quotation from Pridham's and Tennent's work, it seems a pity that in Ceylon, the home of the cat's-eye, that gem should be referred to as a species of quartz, as it unfortunately is in many modern mineralogical works. The true cat's-eye, or what every jeweler would mean by the term, is a variety of chrysoberyl of great value.

The information is given that plumbago is mined in about 400 places on the island, gems in 230 and iron in 30; and that the Temples in Kandy are the possessors of $22,000 worth of jewels and jeweled objects.

The four pages devoted to the South Australian ruby mines, or rather the Australian ruby question, should have been supplemented with the note that these supposed rubies proved on investigation to be pyrope garnets, which are called Cape rubies when found associated with diamonds in South Africa and are also obtained in Arizona, Colorado and New Mexico by the Navajo Indians.

Much interesting matter is given in connection with the great Ceylon pearl fisheries. The pearl oyster "banks" are situated on the northwest coast of the island in the Gulf of Manaar, facing the mainland. They are under a government monopoly, and are not worked every season, but are allowed to rest for one, two or several years to allow the shells to propagate and develop. The fishing season, moreover, is very brief, as it is only in the calm period of the northeast monsoons (February to April) that work can be carried on. The native boats then go out in the night with the land breeze, remain on the banks during the morning, and return soon after noon with the sea-breeze, bringing their loads of shells to be thrown on the shore to die and open. Tables of statistics give an idea of the extent of this industry. From 1796 to 1837, inclusive, the net revenue exceeded £500,000; it is given by two leading authorities, Captain Stewart and Mr. J. L. Siebel, Chief Clerk of the Colonial Secretary, as £524,521 and £585,000. In this time there were only 23 years when fishing was conducted. For the 50 years from 1838 to 1887, inclusive, fuller details are given. Fishing was carried on in only 13 years, averaging 25 days in the season. The number of shells brought in was 156,728,714; of these 138,539,202 were sold for the government, at an average rate of £2 16s. 3d. per 1,000, yielding a net revenue of £268,529. The prices of the shells vary greatly in different years, ranging from 15s. 4d. to £12 17s. 10d. a thousand. The expenditures are considerable, amounting to £98,156 in the fifty years just referred to, and not ceasing, though reduced, in the years in which no fishing is carried on, so as to allow the shells to develop undisturbed.

Since 1850 these figures are of interest, and it must be mentioned that pearls have at least trebled in value since 1860.

Some interesting facts are contained in the reprint of Mr. A. M. Ferguson's paper on pearl fisheries, read in 1887 before the Royal Asiatic Society.

It is to be regretted that in the list of papers reprinted the "Search for Precious Stones," by P. L. Simmons, appears without revision. It contains much interesting matter; but the statement that jade is fragile and intensely hard is erroneous; in fact it is not as hard as quartz and is the toughest mineral known.

Other papers reprinted are: "Gold in Ceylon," from the Colombo *Observer;* "Report on the Geology and Mineralogy of Sabaragamuwa Dis-

trict," by Dr. Rudolph Gygax; "Gems in Sabaragamuwa," by Mr. F. R. Saunders; "The Rocks and Minerals of Ceylon," by A. C. Dixon; "Of the Pearl Fishery on the Coasts of Ceylon," by George Lee; "Ceylon Pearl Fisheries," by George Vane; "The Application of Gems to the Art of the Goldsmith," by Alfred Philips.

Taken as a whole, even as a collection of newspaper clippings, "Gold, Gems and Pearls in India" should find a place in the library of every one who is interested in precious stones or in mining in the Orient. It contains more information on the mineral products of Ceylon than any work that has ever appeared. G. F. K.

BOOKS RECEIVED.

*Triple Expansion Engines and Engine Trials.* By Prof. Osborne Reynolds, LL.D., F. R. S., M. Inst. C. E. Published by D. Van Nostrand Company, New York, 1890. Pages, 191. Illustrated. Price, 50 cents. [We published an abstract of this paper as read before the Institution of Civil Engineers in our issue of August 9th.—EDITOR ENGINEERING AND MINING JOURNAL.]

## CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

### The Mining Engineers' Transactions.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As a member of both the Institute of Mining Engineers and the American Society of Mechanical Engineers, I wish to express through your valuable columns my hearty appreciation and approval of the letter from "A Member of the Institute" published in your issue of November 15th.

While the New York meeting of the Mining Engineers presented an unusually large number of social features, which naturally interfered somewhat with the attendance at the meetings, the difference between the general atmosphere of the sessions of the Mining Institute at New York and of the Mechanical Engineers' Society at Richmond was very noticeable to any one who attended both these meetings.

I trust that the suggestion in the letter referred to above will be carried out, as it would certainly be to the advantage of all concerned.

BOSTON, November 17, 1890. ANOTHER MEMBER.

### Preliminary Plotting.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Replying to the communication of your correspondent, E. M. Keatley, on plotting survey lines, in your issue of November 1st, page 501, the writer begs to say the method described is not "new." A cardboard protractor 12 inches diameter outside, and 7 inches diameter inside, made by Holtzapffel, London, is used on certain work of the Ordinance Survey of Great Britain. To keep the plotting within the bounds of a seven inch circle at all times is impossible and the protractor has to be moved each time as the lines project beyond those limits. I need scarcely say this removal is detrimental to accurate work.

The use of a paper protractor, straight-edge and triangle, is not new in America. I have used it and taught its use to others for more than 20 years. The American-made protractor is of cardboard or paper as you prefer it, 14 inches diameter, solid, and a small equal-sided triangular hole is cut in the center, one side and apex coinciding with the east and west and north and south lines respectively It is divided to 15 minutes and gives two points 14 inches apart for adjusting the straight-edge to the course you wish to plot. A triangle is used in connection with the straight-edge to transfer the course to any part of the paper. In this way the plotting, unless of very large extent, is generally performed without moving the protractor. As to the accuracy of this method of plotting there can be little question. When carefully performed I believe it as accurate as work done with more expensive instruments, and much more rapid in execution. JOHN H. HARDEN.

PHOENIXVILLE, Pa., Nov. 15, 1890.

### Percentage of Phosphorus Required in the Basic Bessemer Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Many of us have doubted whether the basic Bessemer process was likely to be used extensively in this country, because few important ore beds contain enough phosphorus to yield a pig iron sufficiently phosphoric for this process. In the acid Bessemer process the necessary heat is supplied by the oxidation of the silicon of the pig iron. It is not expedient in the basic Bessemer process to use a pig-iron containing much silicon, and the heat needed must come from the oxidation of phosphorus and manganese—perhaps supplemented by iron. Hence, a highly phosphoric pig is deemed essential for the basic Bessemer process.

But we find that, in the acid Bessemer process, thanks to our very rapid running, to the consequently very short intervals between blows, and to the small loss of heat by radiation from the converter during those brief intervals, the pig iron need contain only about one-third as much silicon as is needed in European acid Bessemer practice. Under favorable conditions we blow iron with only 0·70 per cent. of silicon.

Now I want to point out that the very same cause, short intervals between heats due to rapid running, which has led to our using, in the acid Bessemer process, pig iron with only one-third as much silicon as is needed in Europe, may in the future lead to our using in the basic Bessemer process pig iron with only one-half or even one-third as much phosphorus as is needed in Europe; and that, hence, the particular reason for doubting whether we can use the basic Bessemer process extensively in this country, loses its force, for we have plenty of ore beds which will yield a pig iron containing one per cent. of phosphorus. H. M. H.

### Chlorination of Gold Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I notice an editorial on chlorination in your issue of October 18th. I am glad to see such an article on chlorination in the ENGINEERING AND MINING JOURNAL, as I know that all those imaginary difficulties are easily overcome. I am not in chlorination now, but have spent considerable time in experimenting both on the large and small scale on chlorinating gold ores. If you desire, I shall describe minutely the different improvements that others and myself have lately made. To be brief, I will give you an outline of what I mean. First—I propose to use a barrel having a capacity of three tons of ore, as is done at present at Deloro, Canada. Second—I propose to leach by means of air pressure instead of suction. This, by the way, is patented by Messrs. Dennes & Rose, but I am uncertain if patents will stand the test of courts. It is simply astounding what one can do in the way of leaching by simply using from 20 to 30 pounds pressure. The finest raw slimes can easily be leached by a pressure of 40 pounds. The leaching vats could be made of boiler plate and rectangular in shape. When ore is leached perfectly clean, which can be done in two hours by pressure leaching, I would sluice out the tailings, as is done at present at the Ontario mine at Park City. In recovering the gold I would also propose a radical change, namely, pass the gold bearing solution through filter presses containing precipitated iron sulphide FeS. This, under proper conditions, will precipitate the gold almost instantaneously. I have frequently run a rich gold solution through such a press at the rate of 100 gallons per hour, the FeS extracting every particle of gold from the solution.

LEADVILLE, Colo., October 25, 1890. L. D. GODSHALL.

### Determination of Manganese in Iron.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I have read with much interest your articles on analytical chemistry. I think the following method for the determination of manganese in iron, steel, iron ores, etc., should be of interest to your readers. It has been suggested by C. G. Sarnstrœm, Stockholm, Sweden, and has not to my knowledge been published in this country. The method is in general use in Sweden, and I have introduced the same in some American laboratories with good results. The method is very rapid and is based on the same principle as that of Volhard's; the reaction is:

$$2\,KMnO_4 + 3\,MnO_2CO + 5\,H_2O = 5\,MnO_2.H_2O + 2\,CO_2 + K_2O_2CO.$$

For determination of manganese in iron, steel and iron ores, dissolve 1 gram borings (or, in case of ore, the finely ground sample) in HCl, 1·2 specific gravity. For determination in ferromanganese, spiegeleisen and manganese ores high in manganese, take only 0·1 to 0·25 gram. When solution is complete add $HONO_2$, 1·42 specific gravity, to bring all the iron in the state of $Fe_2Cl_6$. Boil, to get rid of the nitrous gases, and test with ferricyan kalium if all iron is in the state of $Fe_2Cl_6$. If this is not the case, add a few drops of $HONO_2$ and boil again. When carbonaceous matter is present, it is necessary to evaporate to hard dryness and dissolve again in HCl, 1·2 specific gravity. It is necessary to boil finally with HCl in order to be sure that the manganese is in the state of $MnCl_2$. Dilute the solution to about 100 c. c. in a large beaker and add a water solution of bicarbonate of sodium in slight excess until the iron is precipitated A too large excess retards the settling of the precipitate. In this case add only a little more water. The iron is present as carbonate of $Fe_2O_3$ in the precipitate, and the manganese in the solution is in the state of carbonate of MnO. Pour water into the beaker until nearly full. Now add permanganate solution slowly from a burette, stirring after each addition in order to mix the solution and facilitate the collection of the precipitate. When the reaction is nearly finished the solution will be slightly colored, but the color disappears after stirring. Finally a drop or two will give the solution a permanent pink color, which will not disappear for several stirrings.

The number of c. c. of the permanganate solution used multiplied by the factor found the Fe factor multiplied by 0·2946) is the amount of manganese in the sample, because 10 FeO will be equal to 3 MnO, or will take the same amount of 2 $KMnO_4$, or $(3 \times 55) : (10 \times 56) = 0{\cdot}2946$.

To facilitate the final reaction, the beaker may be heated to about 50 degrees C. (no more), and if the amount of iron present is not about equal to the manganese, a solution of $Fe_2Cl_6$ (free from Mn) may be added before precipitating with bicarbonate of sodium, because this will facilitate the precipitate to settle.

In case of ores which will not be dissolved in HCl, the sample must be fused with carbonate of sodium before dissolving in HCl.

C. G. HELLMAN, C. E.

27 NORTH CLARK STREET, Chicago, Ill

### The McArthur-Forrest Cyanide Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The following information, though somewhat lacking in practical details, is offered in response to your note of inquiry at the bottom of Mr. W. H. Furlonge's letter in regard to the McArthur-Forrest cyanide of potassium process for the extraction of gold and silver from ores, published in a recent number of the ENGINEERING AND MINING JOURNAL.

The process may be said to be *in embryo*. But it is claimed that it is being successfully used by the Cassel Gold Extracting Company (limited) of Glasgow, Scotland; and certain members of that company, together with others of the Tabor Investment Company, of Denver, have organized the Gold and Silver Extraction Mining and Milling Company, to introduce the process in the United States.

The process is based upon the solubility, under certain conditions, of gold and silver in cyanide of potassium (cyanogen); and these conditions seem to occur in some sulphuret or "refractory" ores that do not yield up their gold and silver contents economically by the usual milling processes.

The cyanide process is patented; the foundation of the patent is the selective affinity of a *weak* cyanide solution for gold and silver, it having been ascertained that cyanogen when greatly diluted in water will dissolve gold and silver in preference to the baser metals, in fact, leaving the latter practically undissolved.

The method of treatment is substantially as follows: The ore is first pulverized to a fineness of 40 to 60 mesh, and it is then mixed with a dilute solution of cyanide of potassium and thoroughly agitated. Six hours' treatment in the vats is generally found sufficient to dissolve the gold and

silver. The mixture is then transferred to wooden tanks where it is allowed to settle, and the supernatant liquid is drawn off and passed through zinc shavings, which cause the precipitation of the gold and silver. From the sources of information at present available it has not been learned whether the cyanide solution is used more than once, or not; nor do they give the method for separating the precious metals from the zinc.

As far as can be learned the process is not in practical use in this country, but it is stated that it is being so used in Glasgow, Australia, South Africa, New Zealand, etc. Still, it is claimed that more than 500 tests have been made on ores from all sections of this country with surprising results. From the results given in the prospectus of the Gold and Silver Extraction Mining and Milling Company it is found that the percentages of gold and silver saved vary from 62 to 100 per cent. and from 33 to 100 per cent. respectively. But the characters and quantities of the ores treated are not given, the general inference being, however, that they were all refractory.

Robert S. Tatlock, F. R. S. E., etc., Public Analyst of the city of Glasgow, states, in two reports, dated September 24th, 1889, that he has tested it himself, and endorses the process as a practical and commercial success, citing his laboratory experiments.

Referring to these laboratory tests, and assuming that the same proportions of ore, water, and cyanide are used in actual work as were employed in the laboratory tests above described, only 5 or 10 pounds of cyanide of potassium and 120 gallons of water are required for each ton of ore, and since but a small proportion of the cyanide can unite with the gold and silver in dissolving them, it would seem that the solution could be used a number of times by simply adding small quantities of cyanide to replace that which has combined with the gold and silver in the previous operation. The extremely poisonous nature of this reagent will, of course, necessitate much care in its use, and in disposing of the solution after it has served its purpose.

As with all new processes time will be required to develop the merits and demerits of this, and one must await the results of practical operations to determine these.

W. DE L. BENEDICT.

32 Liberty street, New York, November 6, 1890.

## THE OXIDATION OF METALLIC SULPHIDES BY THE ELECTRIC CURRENT.

By E. F. Smith.*

Twelve months ago, in a preliminary note (Ber. 22, 1019), the author stated that the sulphur in metallic sulphides was converted into sulphuric acid by the action of an electric current; that, for example, the whole of the sulphur of copper pyrites might be completely oxidized in ten minutes by this method, and that at the same time the oxides of the heavy metals, such as iron, copper, etc., might be eliminated, so that a precipitate of barium sulphate could be obtained quite white and free from the impurities that usually are so readily carried down with it. Details of the method, and apparatus used, are given in the present paper. The apparatus consists of a nickel crucible, from 1¼ to 2 inches high, and from 1¾ to 1¼ inches in diameter, which is suported in a ring of stout copper wire attached to a screw fixed to the base of an ordinary filter stand. The arm of the stand carries another screw, in which a strong platinum wire is fastened, which ordinarily constitutes the anode, the crucible being made the cathode. The other parts of the apparatus are, a battery, a "resistance," consisting of a wooden frame on which about 150 meters of iron wire are stretched, for regulating the amount of current, a commutator for reversing the direction of the current, and a Kohlrausch's ammeter, which is inserted between the commutator and the crucible. The "resistance" and the commutator are essential parts of the apparatus, as different sulphides require different amounts of current, and in some cases it is necessary to reverse the current, because a considerable quantity of metal becomes deposited upon the crucible, thus inclosing particles of undecomposed material. Thirty to forty grams of caustic potash (not soda) are heated in the crucible until the excess of water is expelled, the weighed quantity of the sample is added to it, the crucible is placed in the copper wire support, and the platinum wire forming the other electrode is dipped into the melted mass. It is necessary to keep the crucible covered during the oxidation. The current is then closed and in from 10 to 20 minutes the sulphur is usually perfectly oxidized. The current is then interrupted, the crucible cooled and its contents treated with water, which dissolves all but the metallic oxide that has been formed. The liquid is filtered, acidulated and the sulphuric acid precipitated in the usual way. Should the solution become turbid when acidulated the oxidation has not been perfect. It should be noticed whether sulphur dioxide is evolved when acid is added, and the residue insoluble in water must always be tested for sulphur. If the potassium hydrate contain sulphur, of course a correction must be made on account of this.

The author then describes the oxidation of various sulphides. Zinc blende, cinnabar, galena, argentite ($Ag_2S$), molybdenite ($MoS_2$), antimony sulphide, orpiment ($As_2S_3$), jamesonite ($Sb_2S_5Pb_3$), enargite ($AsS_4Cu_3$), stephanite ($Sb_2S\ Ag_{10}$), kobellite ($BiSb_2S_4Pb_2$), tin pyrites ($SnS_4CuFe$), and fahl ore were all successfully oxidized, the current varying, according to the substance operated on, from 1 to 2 ampères, and the time required for oxidation from 10 to 20 minutes. Copper glance (redruthite, $Cu_2S$) resisted all attempts to completely oxidize the sulphur, repeated reversals of a very large current only resulting in the oxidation of about half the sulphur.

The sulphides of iron act in an interesting manner. Magnetic pyrites (pyrrhotin, $Fe_{11}S_{12}$) was easily oxidized. Similarly, white pyrites (marcasite, $FeS_2$) suffered complete oxidation. On the other hand, yellow pyrites (mundic, $FeS_2$), though of the same chemical composition as marcasite, was most difficult to oxidize, one atom of sulphur persistently remaining unoxidized. By mixing an equal weight of cupric oxide with the pyrites, and using a current of 4 ampères, fairly satisfactory results were obtained. The use of cupric oxide was suggested by the facility with which copper pyrites could be oxidized by this method. The different behavior of marcasite and mundic leads to the assumption that their chemical constitution is dissimilar.

* Ber. 23, 2276—2283, through *Journal of Chemical Industry*.

## THE PRATT MINES OF THE TENNESSEE COAL AND IRON COMPANY, ALABAMA.*

While coal mining in Alabama has been carried on to some extent for a considerable time, it is only within the last few years that it has taken long strides, and now ranks at the head of the Southern States, having passed Tennessee and the Virginias. The same may be said of the manufacture of coke, in which, also, the development has been rapid and steady.

The following table gives analyses of three representative coals of this field, together with that of the Connellsville coal:

| | Pratt. | New Castle. | Black Creek. | Connellsville. |
|---|---|---|---|---|
| Specific gravity | 1·299 | 1·33 | 1·36 | .... |
| Sulphur | 1·041 | ·64 | ·10 | 1·06 |
| Moisture | 1·025 | ·50 | ·12 | 1·20 |
| Volatile matter | 32·169 | 28·24 | 26·11 | 28·50 |
| Fixed carbon | 63·370 | 59·69 | 71·64 | 63·12 |
| Ash | 3·342 | 10·92 | 2·93 | 6·12 |

Tests showed that 8·04 pounds of water were evaporated from and at 212° per pound of coal. The percentage of non-combustible from combustion under boiler was shown to be 7·4, while its relative heating or steaming value, taking Cumberland coal at 100 per cent., is 97·6 per cent.

Among the seams now opened and worked, the Pratt is the most valuable. Jefferson county, in which this seam is mined, furnishes nearly three-fourths of the coal product of Alabama. The other coal producing counties are Bibb, St. Clair and Walker, ranking in the order named. There is plenty of timber on the coal lands for mining operations, and it is well distributed over the entire field, is easy of access, and consequently cheap. The Tennessee Coal, Iron and Railroad Company, the Sloss Steel and Iron Company, the Woodward Iron Company, and the Coal Creek Company operate in the Pratt seam. Of these, the Tennessee Coal, Iron and Railroad Company's mines, known as Pratt mines, are the most extensive.

William Gould was the first to open the Pratt seam, which, at that time, was called the "Gould" seam. He began operations near what is now called Slope No. 1; later he sold out to Mr. H. F. DeBardeleben and associates, who began working the mines on a systematic and extensive scale.

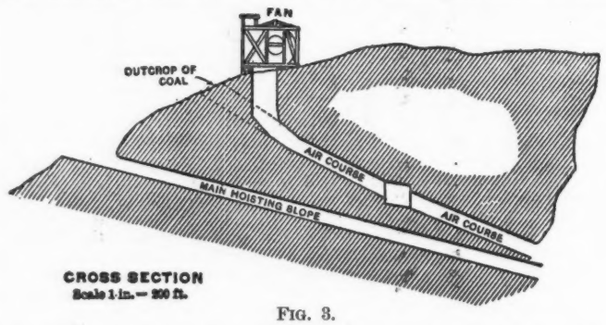



FIG. 3.

A standard gauge railroad was built from the mines to Birmingham. The first mine was Slope No. 1, opened about 1879. It is still in operation. The next opening was Shaft No. 1, after the commencement of which the property passed into the hands of Col. Enoch Ensley and others, of Memphis, Tenn., with the title of the Pratt and Coal Coke Company. Then followed the opening of Slopes Nos. 2 and 3, during the execution of which the Pratt company consolidated with the Alice Furnace Company, changing the name to the Pratt Coal and Iron Company. During 1886 the Tennessee Coal, Iron and Railroad Company absorbed the latter company, and immediately began to develop the property extensively. The construction of the Ensley plant of four blast furnaces was begun, about 1¼ miles from the town of Pratt mines, and to supply these furnaces with fuel, the coke plant at the mines was increased from 110 to 806 ovens; and Slopes Nos. 4 and 5 and Shaft No. 3 were opened to meet the increased demand for coal. Pratt mines embrace slopes Nos. 1, 2, 3, 4 and 5, shafts Nos. 1 and 3, and the Drift mines. All these mines are situated on or near the southeastern outcrop of the Pratt seam of the Warrior coal field. The slopes are opened usually beyond the outcrop of the coal, and begin with a smaller angle of dip than that of the coal, so that the seam is first struck from the under side, and when the height of coal is reached, the slope is simply continued on in the coal. At the outcrop, the dip is in some places as high as 20 degrees; but this decreases rapidly at first, and more gradually afterward, as the field is penetrated. At slopes Nos. 2, 4 and 5, the coal is taken from the various lifts, which are usually 300 feet apart, by the slope engine at the surface, for a distance of 2,000 feet, beyond which point the cars are brought forward to the chain by either mule or engine power. The plan of working the coal has been until within the last two or three years an incomplete system of pillar and room. The idea was to take out all the coal possible, just leaving sufficient "rib" to sustain the superincumbent strata. Very naturally the tendency of this system was to go beyond the safe limit; and, as a result, a crush or creep would be brought on, with a loss of rooms which it had taken time and money to make. The small quantity of coal, left in the shape of small pillars, which would be able to support, for a time at least, the surface, was really surprising to those acquainted with the comparatively narrow rooms and wide pillars left in other regions. Another very serious objection to this plan of working was, that the coal left in these stumps or pillars was forever lost. Instead of being permanently safe, the roof was a constant source of danger, standing, as it were, on stilts, and ready to fall in at any time. Dissatisfaction with this method led to the adoption of the plan shown in Fig. 1. Under the present system, butt or room headings, usually running about water level, are driven off the slopes or main headings at intervals of 300 feet, and the body of coal intervening is worked out by first driving

* Abstract of a paper read at meeting of American Institute of Mining Engineers, New York, September, 1890, by Erskine Ramsay, Pratt Mines, Ala.

rooms 40 feet wide and 60 feet from center to center for a distance of about 275 feet. This leaves a pillar of 20 feet between rooms, which is drawn back to the heading just as soon as the rooms are furnished. In this way all the coal from the fire-clay bottom to the sandstone top is taken out between the headings, leaving the entry stumps to protect the entries. When the room headings have been driven to their destination, which is usually about 3,000 feet, the entry stumps are drawn back, the double entry system providing ventilation for the miners while engaged at this work. By this means not more than 5 per cent. of the coal is lost. There are two widths of rooms, 20 feet and 40 feet, with pillars of 12 and 20 feet respectively. They are designated as single and double rooms; the first having one loading track, the second two. Tee iron rails are used for all tracks; those in the rooms weighing 12 pounds per yard; in the room or butt headings, 16 pounds; and in the main headings or slopes, 35 pounds.

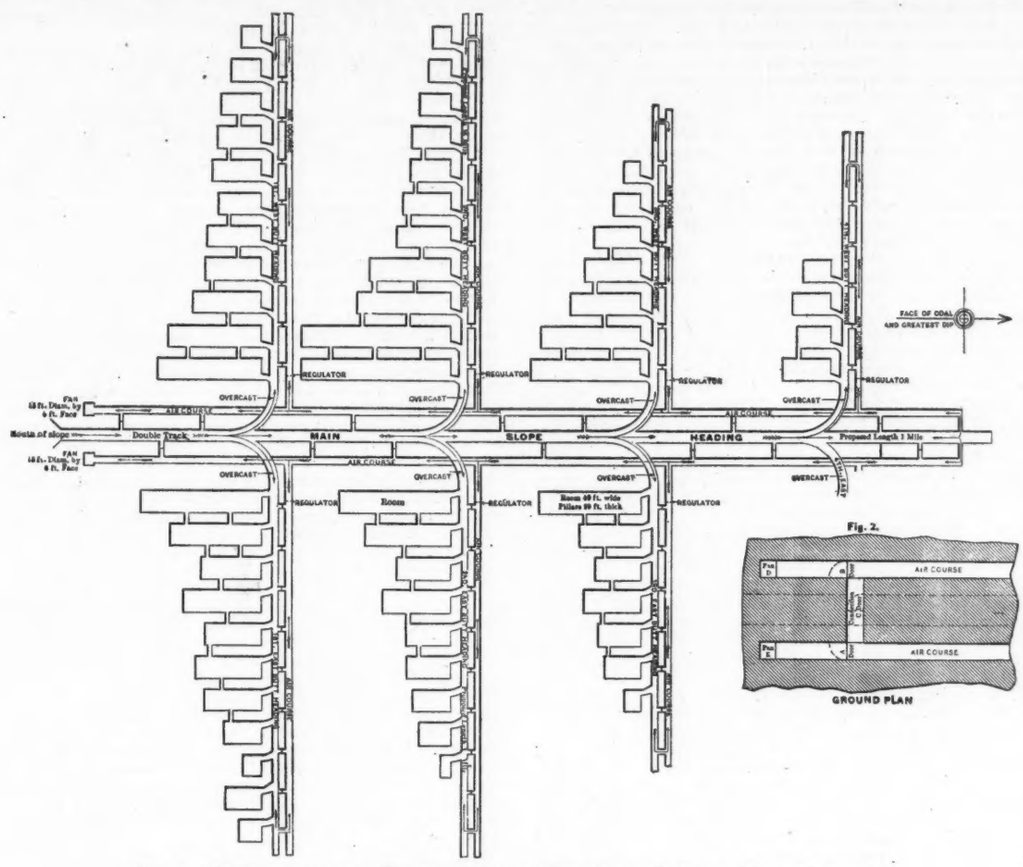
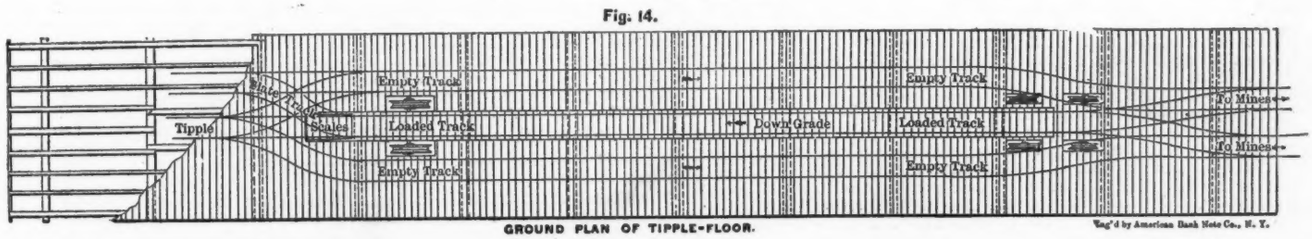
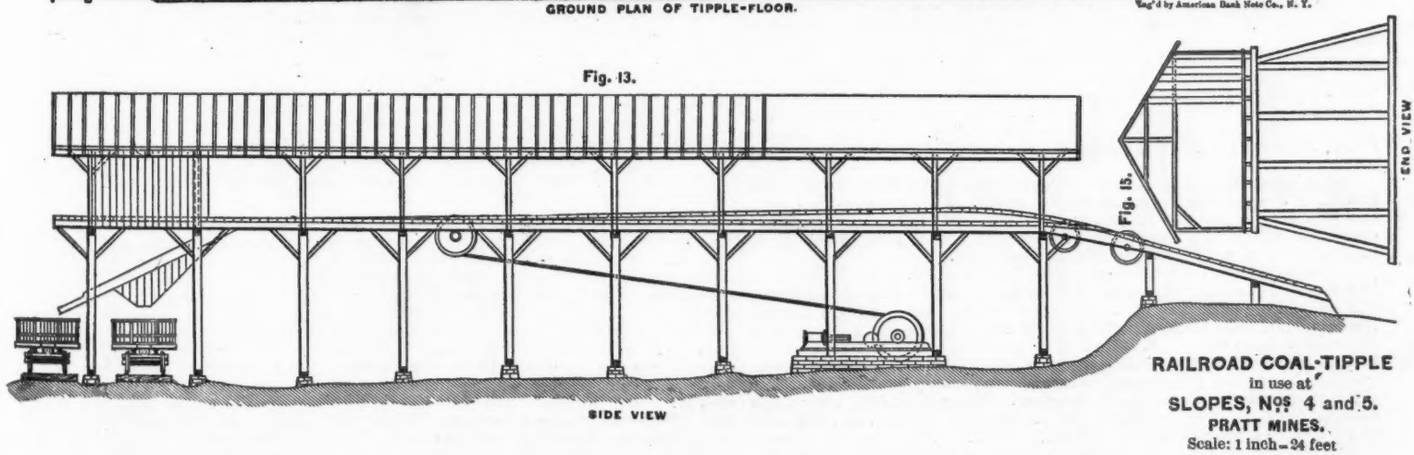



FIG. 1.—VENTILATION AND WORKING SLOPES, NOS. 4 AND 5, PRATT MINES DIVISION.

Scale: 1 inch = 300 feet.




Water is not encountered in large quantities, and contains very little sulphuric or other free acid. Hence there is here none of the trouble incident to bad mine water. Wrought iron pipes and cast iron pump cylinders are used, and last for years. The wrought iron pipe put in at Slope No. 1, ten years ago, did duty until a few months since, when it was abandonded because the water from this mine had been drained to Shaft No. 1, when together with Shaft No. 1 water, it is elevated 225 feet to the

surface, through a 12-inch cast iron column pipe, by a "Young" pump, having 26-inch steam cylinder, 14-inch water cylinder and 48-inch stroke.

With the exception of slopes Nos. 4 and 5, and (partially) No. 2, the mines are ventilated with the one continuous current of air. At Nos. 4 and 5 the split-current system is used, as shown in Fig. 1. By reference to this figure it will be seen that all the air enters at the mouth, and, traveling down toward the face of the slope, parts with a portion of the current at each set of lifts, where it divides right and left. The remainder continues down the slope to the next lift, where the same thing occurs; and so on to the face of the slope, where what air remains splits right and left, and returns along the air course running parallel with the slope. These currents on either side of the slope are augmented by receiving from the last pair of headings, through their respective air courses, what air they received from the main current on its way down. The amount of air received at each of the lifts is regulated by air regulators in the air-courses of the room-headings, and near the slope air-course. At each of the lifts the air on its return along the main air-course crosses by means of an overcast, as shown in Fig. 1, and proceeds to the next heading, and so on, until the fan is reached near the mouth of the slope, and the air passes out. A fan of the Guibal type, 15 feet diameter by 6 feet face, is located on either side of the slope at the air-shafts, thus making the ventilation of each side of the mine independent of the other, so that, in case of a break-down, only one side would be affected, and this only for a few minutes, or until the proper doors could be opened and closed and the remaining fan caused to furnish the ventilating power for both halves of the mine. This arrangement is shown in Figs. 2 and 3, the former being a ground-plan and the latter a section. It will be seen that, should any accident occur to the fan D, the simple closing of door B and the opening of doors A and C (or, *vice versa*, should fan E become disabled, the shutting of door A and the opening of doors B and C, would place both sides of the mine in communication with fan E or D respectively. There are no doors to be left open, thereby disarranging the entire ventilation beyond; the drivers are not hindered in their work by having to pass through trap-doors or wait for them to be opened, but have a clear road all the time. Each heading receives its own quota of pure, fresh air direct from the slope. The gases from blasting with powder or dynamite do not affect any person beyond the heading in which the blasting occurs.

The coal-seam is remarkably uniform in quality and thickness, averaging 4 feet 6 inches. The roof is usually a hard sandstone which requires very little propping. One of the notable geological features of the seam and a distinguishing characteristic is the persistency of a band of slate, about 8 inches from the top, which ranges in thickness from 1 to 2 inches.

The usual mode of mining is first to undercut about 3 feet, and shear along the side or rib. Then holes are bored in the coal (the number depending on the width of the place and the ideas of the miners), usually by some hand-drill. The coal is then shot down; after which it is cleaned of the band of slate, and loaded into the 25-cwt. mine-cars. The greater portion of the coal is mined by hand; but there are at Shaft No. 1 some 13 Harrison mining-machines. The coal is admirably adapted to the use of these machines, owing to the comparatively great width of the rooms, which reduces to a minimum the time lost in shifting machines from one room to another. One skilled machine runner and one ordinary mine laborer, to shovel away the cuttings, are required at each machine. It cuts an open channel under the coal of any desired vertical height, usually from 8 to 10 inches in front and tapering to 2 inches in the rear, making an average of 5 inches. The depth of the undercut is made 4 feet 6 inches. The pick strikes from 175 to 200 blows per minute, and as it works under the coal, the runner allows the machine to run forward down the platform and swings the pick from side to side as it advances, while the helper throws back the cuttings. With this machine a man undercuts along the face for a distance of 90 feet and to a depth of four feet six inches per shift, making a total area of 405 square feet of floor surface cut over, and this produces about 60 tons of merchantable coal. There are at this mine several power rock drills of the Sargeant, Ingersoll and Rand make. These drills are used for rock work. Two Allison duplex air compressors, having 22-inch steam cylinders, 24-inch air cylinder and 42-inch stroke, furnish the compressed air to operate the mining machines and rock drills, as well as some of the smaller direct-acting pumps, located in remote parts of the mine. Either one of these air compressors has sufficient capacity to do all the work. The air is delivered directly into a receiver, 46 inches in diameter by 24 feet long, whence it is conveyed to the bottom of the shaft through 8-inch pipes and there it is divided and conducted by 6-inch pipes to both sides of the mines, along the main roads. In the room headings, a 2½-inch pipe is found large enough in most cases, and a 1¼-inch pipe in the rooms, the connection being made with the machines by one-inch rubber hose.

The hoisting engines are direct-acting, coupled direct to the drum-shaft, and have the crank-pins set 90 degrees apart. They are provided with cast-iron conical grooved drums, and 1¼-inch cast-steel wire rope. The cages are provided with safety attachments and are wide enough to handle two 1¼-ton cars, side by side, at each hoist.

The arrangement for handling the coal at slopes Nos. 4 an 5 is shown in Figs. 13, 14 and 15. The bents of these plants consist of 10 by 10 inches timber, and the deck floor of 3-inch pine plank. These slopes, like all the slopes at Pratt Mines, have two tracks running into the mines, and at slopes Nos. 4 and 5 (see Fig. 14), these tracks converge to a common central track extending from knuckle to the dump. This track has a down-grade of 1 per cent. in favor of the loaded cars, which greatly facilitates their movement forward to be dumped. When the cars have been dumped they are switched right or left to the empty tracks, on either side of the loaded track and parallel with it. Both empty tracks are also on a down-grade of 1 per cent., but in an opposite direction to that of a loaded track. This permits the empty trip to be easily moved off at the knuckle and sent into the mines. The hoisting engines are double, 12 by 20 inches, and geared 1 to 4. The drums run independent of each other. By means of a V-clutch they can be thrown in and out of gear at will. By this arrangement either or both can be lowered at the same time, at different speeds and to different lifts. Where power is applied in underground haulage, the tail-rope system is generally used, except where the grades, being heavy enough and in one direction, the simple engine-plane takes its place. A system of tail-rope haulage now under course of construction has but one curve in its entire length of about 3,800 feet. The engines are located at this curve, 140 feet back from the hauling-road, to give sufficient lead to cause the rope to coil regularly on the drums. From the curve, or engine location, to the point where the coal is delivered is about 2,700 feet, while the distance in the opposite direction to the return sheave is about 1,100 feet.

Located near the bottom of an air-shaft 360 feet deep, are two 2-boiler batteries of cylinder boilers, 46 inches diameter by 24 feet, either battery of which is able to supply sufficient steam to operate the engines and pumps. The boiler-house is neatly arched with a 13-inch hard-brick wall, set in cement, thus making it fire proof and perfectly safe against the spawling or falling in of the mine roof. The waste heat from the boilers is utilized by being led into the air shaft, thus heating the returning air from the mines, and aiding the current of ventilation. A brick partition is built in the shaft to prevent the flame or heated gases from the fires under the boilers from coming in contact with the return air from the mines. The location of the boilers saves the hoisting fuel. In addition, there are no long steam lines to keep up in the shaft. All the water from this section of the mines is brought to the pumps, which are located near the boilers, through a canal or ditch 10 feet deep. It is so arranged that no inconvenience would be caused should the water rise to the top of the canal. This gives immense storage capacity. The canal connects the sump with acres of old worked out rooms, between which the room ribs have been left standing to keep up the surface.

The coke-plant consists of 806 ovens, 581 of which are near Slope No. 1, 225 at Shaft No. 1, and 250 at Alice Furnaces, Birmingham. They are of the bee-hive type, and, with the exception of a few, are 12 feet in diameter by 6 feet high in the clear. All these ovens are charged from "larries" containing one charge each, which run upon tracks of 5 feet gauge, extending the full length of the lines of ovens. At Alice Furnaces these larries receive the coal from a bin, supplied from the mine railroad-cars, which, being placed on top of the bin, are dumped by means of the drop-bottoms. The larries at shaft No. 1. receive their coal from a bin which is supplied direct from the mine cars. The plant of 581 ovens at slope No. 1, is supplied from a large new bin, having a capacity of 5,000 tons, and supplied like the one at Alice Furnaces noted above. The bin is provided with 3 larrie-tracks extending its full length, thus permitting the coal to be drawn from the bins into the larries at any point desired. The ovens are charged with 5 tons of coal, which produce 3 tons of coke, the yield of coke being about 60 per cent. After the ovens have been carefully levelled, the doors are closed up with brick and luted, space being left near the top to furnish sufficient air to carry on combustion. The coke produced from Pratt coal compares favorably with the typical Connellsville article, being but little higher in ash and other impurities, and, consequently, about as high in carbon. It has, to a great extent, the characteristic metallic ring, and stands, without difficulty, the burden in our highest furnaces. The experiment of washing the coal preparatory to its manufacture into coke was tried by the Woodward Iron Company, which put up a substantial plant of about 500 tons capacity per day; but, after having operated it for one year, decided to resume the coking of its coal unwashed. Washing of Pratt coal has been tried also by the Coalburg Coal and Coke Company, which made several unsuccessful attempts. In other seams the Cahaba Coal and Railroad Company has tried washing and abandoned it because of the increased cost.

The coke made at Pratt mines is mainly used at the Tennessee Company's Ensley plant of four 20-feet by 80-feet blast furnaces, located about one mile from the coke ovens. The company owns a system of railroad tracks, which enables it to ship coke to its furnaces, coal to its coke ovens, and coal, iron and coke to Birmingham.

Following is given the company's output in different years: 1883, 487,425 tons; 1884, 511,523; 1885, 511,058; 1886, 588,028; 1887, 693,353; 1888, 832,854 (strike); 1889, 1,084,784; first half of 1890, 564,976.

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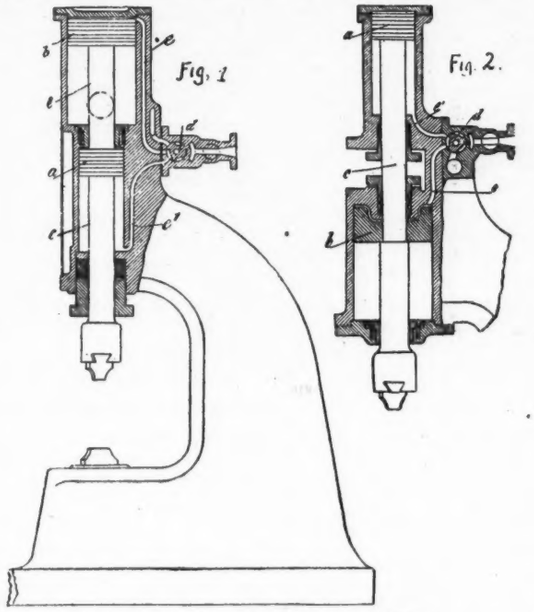
**The Slate-Pencil Quarries in Meiningen, Germany,** belong to the public domanial, which leases them to the slate-pencil makers for 8,000 marks annually. As pointed out in our issue of May 3d, the industry has of late been far from lucrative; the government, therefore, intends to take it over and run it. On the probable calculation that 310 million slate pencils 14 centimeters long can be produced annually and sold at about one mark per thousand, the annual income would amount to about 310,000 marks. The total costs, according to *Kuhlows*, amount to 267,000 marks, among which are 232,500 marks wages for 310 slate-pencil makers, who receive 75 pfennigs per thousand. All expenses paid, inclusive of laborers' insurance, there remains a surplus of 42,000 marks, of which 8,000 marks will be assigned as heretofore to the domanial treasury and 34,000 to the reserve fund.

**Oil Projectile for Use in Calming the Waves.**—The *Centralblatt der Bauverw.* reports, that for the calming of the waves of a high-going sea with oil, a projectile in the shape of a wooden cylinder has been arranged in the fore-body of the ship. It is 46·5 centimeters long and has an outside diameter of 65 millimeters; the inside can hold 300 grams of oil. The lower end of the projectile is protected by a sheathing sheet against the effect of powder. If a weight is fastened to the projectile it causes it to swim in a perpendicular position. Near the point are three openings, under the water, by which the sea water can enter into the cylinder and drive out the lighter oil in consequence of its greater specific weight. To prevent the oil from trickling from these openings before the firing takes place, they are pasted over with paper, which dissolves directly in the sea water, the opening thus being set free. In the pierced point of the projectile a cavity is placed, filled with phosphureted calcium, which by the access of sea water produces phosphureted hydrogen, which possesses the quality of spontaneous ignition and burns with a blue flame. A mortar is used for the firing of the projectile. Herr Silas, archivist of the French embassy in Vienna, is the inventor. At the trials made in France, the projectile went as far as 360 meters, flashed up instantaneously and covered, within 12 minutes, the surface of the sea for a distance of 900 meters.

## A COMPOUND STEAM HAMMER.

The accompanying illustrations are descriptive of a compound steam hammer, the invention of Mr. Julius E. Reinecker, Chemnitz, Saxony. This hammer is of the double-acting type, the upward or lifting stroke being given by the high-pressure cylinder and the downward stroke or working blow by the low-pressure cylinder. The inventor claims that in this way the full advantage of the expansion of the steam is obtained.

As shown in Fig. 1, there are two cylinders, one above the other, with two pistons, *a* and *b*, having a piston-rod *c* common to both. The valve *d* is so operated that the steam passes first through the passage *e'* into the small or high-pressure cylinder below the piston *a*, thus raising the hammer; the valve then establishes communication between the lower and upper cylinders, and steam passes from the high-pressure cylinder through the passages *e'* and *e* to the large cylinder above the piston *b*, where it aids the force of gravity, or weight of the moving parts, in giving the downward blow of the hammer.




REINECKER COMPOUND STEAM HAMMER.

The spaces in the cylinders above the small piston and below the large piston are in communication with the atmosphere, in order to prevent resistance to the motion of the hammer.

Fig. 2 shows a method by which this arrangement can be applied to old hammers. The existing cylinder is used as the high pressure, and a low-pressure cylinder is attached to the frame below, in any convenient manner. In this case, as will be seen, the position of the cylinders is simply reversed, the action being substantially the same.

## AS OTHERS SEE US.

Mr. E. Dickinson, Sheffield, England, who participated in the recent international meeting of engineers, stated, when interviewed on his return to England regarding his impressions from his journey, according to *The Iron and Coal Trade Review*, that the Americans consider that they are in every way in advance of the mother country, and, in fact, of all the countries in the world. "Their buildings and institutions are bigger and better than anywhere else; their works and manufactories are on a very large scale, and the output, owing to improved organization, is considerably more than would be secured by the same number of men and the same amount of plant in England."

As an instance, the works of Disston & Sons, at Tacony, where saws and files are manufactured, turn out an output in saws equal to the total output in Sheffield. Their products are all machine made.

Generally, machinery is more extensively used than in England. At Disston's works, Mr. Dickinson was struck with the machines for cutting and at the same time graduating the teeth of hand saws. They were fed by lads, and the blades passed through as quickly as it was possible to handle them. The machines cut 1,500 teeth per minute. The same firm also has a much more expeditious and improved method of "goffing" and tempering than Sheffield firms have. The furnaces used for this purpose are heated by gas, and have a revolving center. He was very much interested in the manufacture, at Disston's, of circular saws with renewable and interchangeable teeth, an invention he termed "capital." In the warehouse mentioned, he observed packages of saws addressed to England, and also saw some hand saws there 40 feet in length, by 14 inches wide.

"The American manufacturers go more in for quantity and rapidity of output than quality; but they do not care to put work and high finish on parts of machinery that are not seen."

"In general tools they have not anything like the same number of patterns, consequently in slack times they can make immense stocks, and know exactly how long it will take to dispose of them."

The American products he did not find superior to the English, and in many cases decidedly inferior. "But the Americans are much more inventive than other nations, and their patents much more valuable."

Mr. George Siddell, Sheffield, was greatly impressed by the abundance of our resources, the rapidity of our industrial development, the enterprising spirit, industry and application of our people. Greatness, he thinks, is equally characteristic of the manufactures here and of the physical resources of the continent. Everything he found to be on an extensive scale, except guns and ships. And the fact that the government has bought up the nickel mines he interpreted as significant of its intention of making armor-plates on a very different scale from anything as yet attempted. The American manufacturers never stint expenditure as to plant and machinery; and labor-saving appliances in the iron and steel works, and especially in the rail and plate mills, cut manual labor down to a mere cipher. Therefore he believed that but for the tariff the American manufacturers would be able to compete with the English in any market.

As to the output of the American works, he admitted its greatness, but thought that in England the Consett Iron Company turns out about four times as much as the largest American works. Whereas, Carnegie's output is about 4,000 tons a month, the Consett Iron Company produces about the same quantity every week. Carnegie's place is magnificent. The arrangement of the melting furnaces, both there and at some of the other places, is splendid. There is nothing in England that comes up to it. Some of the melting furnaces have a capacity of 35 tons, and there are hardly any in England greater than 30 tons. They have many circular furnaces, too, which are not seen in England, but he did not know that there is any great advantage in that mode of construction. At Chicago they roll direct from the ingot, without re-heating, which is also done in some English works, but Carnegie's method of rolling from the bloom he considers by far the safer plan.

Asked as to the comparative capabilities of English and American works, Mr. Siddell admitted the superiority of the American rail mills, but as to large forgings they do nothing beyond 10 tons, "whereas the English works can run up to any weight that there is a call for." He qualified however, these statements by remarking that he had not inspected the Bethlehem Works, where the Government orders are executed for gun forgings and the like. "There is a splendid opportunity," Mr. Siddell added, "for energetic Englishmen to go out there in the heavy trade. They might make a fortune in a very short time, because there is no heavy work done there yet. They are just commencing with the guns, and any one well up in gun forging could command his own price."

Both gentlemen were full of admiration for the American workingmen as steadier, more intelligent and quicker than the English operatives. They work harder and longer hours. Mr. Dickinson's belief that the American workman who receives £3 a week is not better off than the Englishman who only gets £2, owing to the smaller purchasing power of money in America, is hardly compatible with his utterance that the American workingmen "struck him as being well dressed, and having very comfortable homes; and a higher social tone prevails among the artisans there than in many of our industrial centers."

That America is far ahead of Europe in the number and variety and efficiency of electrical appliances was acknowledged as an undisputed fact.

Mr. Dickinson ventured the opinion that English firms transferred to American soil might be highly successful if they had enough enterprise and energy. Another statement of Mr. Dickinson to the effect that "Americans admit that in cutlery they cannot approach the English for quality; that the well-to-do Americans invariably have English cutlery for their own use; and that you cannot pay an American a greater compliment than to give him a really good Sheffield knife," needs no comment to be appreciated.

**Asiatic Mining and Smelting.**—A note to the last administrative report of the Shan States, says the *Colliery Guardian*, describes the native method of mining for iron. At the Legya mines there are three shafts on the side of a hill, and on a ridge at a little distance is a number of shallow workings, from which most of the ore now extracted is obtained. The former are said to be of considerable depth. All are very narrow. Before the devastation of Legya State, men used to come from the neighboring villages, bringing one or more pack bullocks. The ore mined by them was placed on the bullocks, taken to the smelter, and bought by him at eight annas (1s.) per load. Work is now, however, only carried on in a small way. Each furnace has two workers, the smelter and his man. The former goes himself and mines the ore during the day, usually returning when he has filled two cooly baskets, this being as much as can be worked at one smelting. The latter's work is to make sufficient charcoal for the smelting. This he does from pine wood, which is abundant. The furnace is made of earth, and has two openings. In the lower the charcoal is placed, and banked up so as to keep in the heat. The ore, having been broken up and pounded till it is as fine as gravel, is dropped into the furnace, a handful at a time, through the upper opening, charcoal being put in with it. A blast is obtained by means of bamboo bellows of the kind seen in the ordinary Burmese or Shan smithy. The smelting begins at about 2 A. M. and is finished by sunrise. The piece of metal obtained, on being taken from the furnace, is cleft almost in two, so as to admit of being carried on a bamboo. The quantity of ore which yields one of these pieces varies, of course, according to its quality. In an experimental smelting carried out in an extemporized furnace, 50 pounds of ore yielded a piece of metal weighing 10 pounds, the smelting being completed in less than four hours. If the smelter works constantly and at his usual rate, he has four of these pieces of metal at the end of the fourth day. On the fifth day he and his men take these to the bazaar, where they are disposed of at once, a ready demand being found for all he can turn out, and the rest of the day is usually kept as a holiday. The metal is bought by smiths from the neighboring villages, and a certain quantity is taken by traders to Bampein, where ploughshares are made; but with this exception it is all worked in the neighborhood of the mines, and the manufactured articles are sold at the local bazaars. The smiths have, as a rule, from three to six men, and, having bought the metal from the smelter, like him work hard for four days and on the fifth day go to the bazaar to sell the manufactured articles and to get a fresh supply of metal. The latter is reheated in the smithy, and beaten out into a flat rod, which is cut off into lengths of a size suitable for the working of the article intended to be made. Six men are required for this process. A smith with less than five men is assisted by those of a neighboring smith, and usually pays for their services with small pieces of metal.

## THE DEPOSITION OF CARBON FROM CARBONIC OXIDE GAS.

Written for the Engineering and Mining Journal by A. D. Elbers.

The phenomenon, that the monoxide CO or carbonic oxide gas can react on iron ore and on oxidized iron in such manner as to deposit carbon on the incompletely deoxidized metal, has led to the assumption that a portion of the CO reacts in some undefined manner on the metal, and that another portion changes in the presence of the metal, and without reacting on it, to carbon and dioxide, according to the formula:

$$2\,CO = CO_2 + C$$

which may be graphically expressed as:

$$\begin{matrix} C=O & C=O \\ C\,O & = C=O \end{matrix}$$

But the monoxide cannot be deposed by heat alone, at least not by the highest heat that is ever obtained in metallurgical operations. Even if that were possible, the dissociation of each molecule of the gas would absorb as much heat as is required for the formation of each molecule. This thermo-chemical principle is fully recognized—in the computation of heat-requirements for the blast furnace—by the very authors who uphold, on the other hand, "that the monoxide can *react on itself* at a temperature of from 200 degrees Celcius upward and until that point is reached where the dioxide that results from the deposition of the carbon can *redissolve* the latter."

But carbonic dioxide ($CO_2$) cannot, properly speaking, dissolve carbon. Carbon can only be gasified by direct combustion, viz: by coming in contact with a stronger or more "electro-negative" element that either is in the gaseous or in a vaporized state or gets into one of these conditions at a somewhat lower temperature than the one which is necessary to arouse the chemical energy of the carbon. Sulphur, for instance, can gasify glowing carbon by uniting with it to carbonic disulphide ($S_2 + C = CS_2$) because it is electro-negative to carbon and because it vaporizes at a suitable temperature, for the same reason it can unite directly with iron, which carbon cannot do because it can neither melt nor vaporize. Carbonic disulphide dissolves sulphur because it is liquid and volatile and because sulphur melts and volatilizes, hence the latter can dissolve in the former; but carbonic dioxide can only react on carbon in an indirect manner, viz.: when it comes in contact in glowing carbon it is deprived of one atom of oxygen, and the oxygen thus freed re-burns with the carbon to dioxide. Thus dioxide of carbon can change to monoxide, which the dioxide of sulphur ($SO_2$) cannot do because sulphur and oxygen are so nearly related to each other—electro-chemically speaking—that oxygen cannot be induced to part from the $SO_2$ merely for the purpose of re-uniting with fresh sulphur. Hence no monoxide (SO) forms in burning sulphur with oxygen, whereas, in burning carbon with oxygen, the monoxide CO must form—at least transitorily—even when the carbon and oxygen are in the proportion of: $O_2 + C = CO_2$, viz.:

$$\begin{matrix} 2C + 4O = 2CO_2 & \{ & O=C=O \\ & \{ & O=C=O \\ +\,1C \quad = \quad CO_2 + 2CO & \{ & C=O \quad C=O \\ & \{ & O \quad\;\; C=O \\ +\,2O = 3CO_2 & \{ & C=O=O \\ & \{ & O \quad\;\; C=O=O \end{matrix}$$

$3C + 6O = 3CO_2$, the ultimate result being the same as if no dissociation and recombination had taken place. On the same theory, $x\,(CO_2 + C)$ cannot react completely, but only to: $y\,CO + (1CO_2 + 1C)$, inasmuch as the last molecule of $CO_2$ cannot become decomposed, because the chemical attraction, which compels one atom of oxygen to leave the dioxide, ceases to operate when the quantity of the oxygen that can still be surrendered ($1CO_2 - O = 1CO + 1O$) is insufficient to burn up the last molecule of carbon (1C).

The foregoing will make it plain that carbonic dioxide cannot dissolve—or combine directly with—carbon, and that carbonic oxide is not a primary but a reduced compound.

As the dioxide can only lose oxygen on account of the great affinity which the latter has for carbon, the proposition that the oxygen of the monoxide should let the carbon with which it is combined go voluntarily as it were, seems to be rather anomalous, and the further proposition that this dissociation shall progress most rapidly at a temperature somewhat above 400 degrees C., is in absolute conflict with the fact that the formation of CO, from $CO_2 + C$, only takes place at a much higher temperature. In the deoxidation of iron by CO at a temperature whcih is much lower than that which is necessary to unite iron directly with oxygen, there is no split involved, but only an analytical reaction, FeO — O, that is followed by the synthesis, O + CO, and the difference between the heat that is absorbed by the first reaction and that which is set free by the second one is so small (about —2,000 calories) that the formula, $FeO + CO = Fe + CO_2$, is in perfect harmony with thermo-chemical rules, even when the reaction to which it has reference takes place at as low a temperature as 140 degrees C.

These considerations render it necessary to account for the deposition of carbon in some other manner; and after it is once conceded that the monoxide must be the essential deoxidizer of iron, as well as its essential carbonizer it seems quite rational, in casting about for the solution of the problem, to raise the question, whether Fe = O C = O C = O can combine, directly or indirectly, to Fe = O = C O = C = O, in other words, whether the so-called *deposition* of carbon, on incompletely reduced iron, does not simply indicate the formation of *oxy-carbide of iron.*

Such a formation would be somewhat analogous to that of calcium oxy-sulphide (Ca O S) in sulphurous slag, and especially in a slag wool or mineral wool, which takes place when these materials are carefully roasted. Certain kinds of mineral wool that are perfectly white and contain from ½ to 4 per cent. of Ca S, turn perfectly *green* in being roasted, and change again to white in the measure in which the sulphur is driven out (as $SO_2$). The oxy-carbide of iron can possibly be also identified by some characteristic change in the color of the metal experimented upon for the deposition of carbon that has not yet been looked for; but even without that its supposed existence and occurrence, under the conditions referred to, may serve to bring into logical connection those isolated facts or phenomena that have thus far given rise to untenable theories, the latter being mainly derived from laboratory experiments that bear but a faint resemblance to the actual metallurgical processes which they are intended to illustrate.

The oxy-carbide of iron may be supposed to form as follows:

Reaction No. 1.

$$FeO + 3CO = FeC + 2CO_2 \ldots \begin{matrix} \{ & Fe=O & C=O \} \\ \{ & C=O & C=O \} \end{matrix} = \begin{matrix} Fe & O=C=O \\ C & O=C=O. \end{matrix}$$

Reaction No. 2.

$$FeC + CO_2 = FeOC + CO \ldots \begin{matrix} \{ & Fe=C & \} \\ \{ & O=C=O & \} \end{matrix} = \begin{matrix} Fe=C & C=O \\ O & \end{matrix}$$

Reaction No. 3.

$$FeOC + 3CO = FeC_2 + 3CO_2 \ldots \begin{matrix} \{ & Fe=O=C & C=O \} \\ \{ & & C=O \quad C=O \} \end{matrix} = \begin{matrix} Fe=C=C \\ C=O=O \;\; C=O=O \end{matrix}$$

Reaction No. 4.

$$FeC_2 + CO_2 = FeOC_2 + CO$$

Reaction No. 5.

$$FeOC_2 + 3CO = FeC_2 + 2CO_2$$

The foregoing formulæ have to be interpreted as follows: The total metal may—at the beginning of the experiment—consist of iron and oxygen in any state of combination, from that of $Fe_{12}O_{16}$ down to $Fe_{12}O_{12}$ or $3\,Fe_4O$ (see ENGINEERING AND MINING JOURNAL of February 21st, 1890, "Comments on the Chemical Reactions in the Blast Furnace"); the $Fe_4O$ then changes gradually to $Fe_4OC$ ($3\,Fe+FeOC$), $Fe_4C+C$, etc., the heat-producing changes (reactions 1, 3 and 5) setting free enough heat to enable the dioxide to reoxidize the iron (reactions 2 and 4) according to the formula: $Fe+CO_2=FeO+CO$, viz.:

$$CO_2 - O = -67{,}200 \text{ calories.}$$
$$O + Fe = +69{,}264 \quad \text{"}$$

but not enough to enable the dioxide to reoxidize or "burn up" the carbon itself, which, according to the formula:

$2\,CO_2 + C = CO_2 + 2\,CO$, would require:

$$2\,CO_2 - 2O = 2 \times 67200 \text{ calories.}$$
$$2O + C = 96960 \quad \text{"}$$

Inasmuch as the experiment to which these calculations apply is carried out with ready-made monoxide gas, the heat required for the dissociation of one molecule of CO out of three, viz.:

$$\begin{matrix} Fe=O & C=O \\ C=O & C=O \end{matrix} = \begin{matrix} O=C=O \\ O=C=O \end{matrix}$$

has to be charged with $\frac{2\times 96960}{4} = 48480$ calories ($12 \times 4040$), because the formation of 4 CO, from carbon, requires the combustion of 2 C to $2\,CO_2$, hence the dissociation of each molecule of CO requires one-fourth of $2 \times 12 \times 8080$ calories. If the monoxide were generated *inside* of the apparatus, as it is generated in the blast furnace, then the proper formula for calculating the equivalent for the dissociation of each molecule of CO would be: $12 \times 2473$ calories.

When speaking of the formation of pig iron the notation $Fe_4C$ stands for fully carburized homogeneous or *white* iron. The so-called graphite that segregates when such white iron is changed to "gray" must still be a homogeneous or "true" carbide, otherwise the gray iron could not be again changed to white iron of nearly the same degree of carburization, for segregated "carbon," pure and simple, could not recombine with the iron. But when speaking of reactions that are started at a temperature of 400 degrees C. or less, the resulting $Fe_4C$ or $3\,Fe + FeC$ cannot be a homogeneous compound, because even the gasified carbon contained in the CO cannot unite thoroughly with the iron as long as the latter is below full red heat. Conversely, the phenomenon that an *increase* of carbon can take place when two pieces of steel have been treated in the coal fire for *welding* can be readily explained without jumping to the conclusion that some coal must have got between the welding surfaces and then must have *melted!*

Perhaps this assumption of the formation of oxy-carbide of iron, though admissible thermo-chemically, may be objected to on other grounds, which would have to be regretted, for it seems to be just such a theory as is needed to connect a great many phenomena arising out of the combination of iron, oxygen and carbon that have, thus far, to be set down as exceptions from general laws.

In adhering strictly to the theories herein evolved, it would also be wrong to admit that the FeO and the combined carbon of liquid-melted masses can react on each other according to the formula: $FeO + FeC = 2\,Fe + CO$, inasmuch as the carbon cannot be supposed to enter a substitution-reaction, but can only burn to $CO_2$, according to the formula: $2\,FeO + FeC = 3\,Fe + CO_2$. Nor would it be permitted to suppose that the contact, of solid ore and carbon, however finely intermixed, can produce the reaction $Fe_3\,O_4 + 2\,C = 3\,Fe + 2\,CO_2$ in any measurable proportion as far as the *essential* progress of the deoxidation is concerned, or that the oxygen can "flop over," as it were, out of lumps of magnetic oxide and into the coke or coal. Why accuse the oxygen of such extravagant performances when it is so easy to explain that the carbonic oxide enters the ore and "does the whole business" by comprehensible methods?

HOBOKEN, N. J., Nov. 17, 1890.

**Purchase of Stock for Actual Delivery.**—Where, at the request of another, a person advances money, with which stocks are to be bought, which are purchased and delivered to the broker through whom the purchase is made, to be held by the broker for delivery upon payment of the balance of the purchase money; in default of the completion of the contract the one who advanced the money can recover it from the one for whom it was advanced, as the actual delivery of the stock was contemplated, and it was not a gambling contract.

*Potts vs. Dunlap, Supreme Court of Pennsylvania*, 20 *At. Rep.* 413.

**Supplying London with Fuel Gas.**—It has been proposed by a member of the London City Council, according to the *Coal Trades Journal*, to manufacture gas, both for fuel and for lighting, at the mines either in Staffordshire or in South Wales, and bring it into London by a pipe line. It is estimated that the saving of the valuable real estate now occupied in London for gas works and coal storage yards would alone be a considerable inducement toward the establishment of the pipe system. The gas mains now laid down in London aggregate 4,000 miles, and the proposed pipe line, even if 100 miles long, would not seem to be a large addition. A double system of pipes would be needed if both fuel and illuminating gas were to be carried.

## THE ADAMS PROCESS FOR THE DIRECT PRODUCTION OF IRON.*

By Henry M. Howe.

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In the Adams process† ore in lumps three inches cube and smaller, sometimes mixed with 10 to 15 per cent. of solid fuel, and while standing in four ingeniously regeneratively heated vertical chambers *cccc* above an open-hearth furnace, is heated and reduced by a current of hot gas. It passes thence either continuously, or better one chamberful at a time, through the chute *d*, into a bath of molten cast-iron in the open-hearth furnace, diluting and probably also oxidizing the carbon and silicon of the bath, quite as in common open-hearth practice.

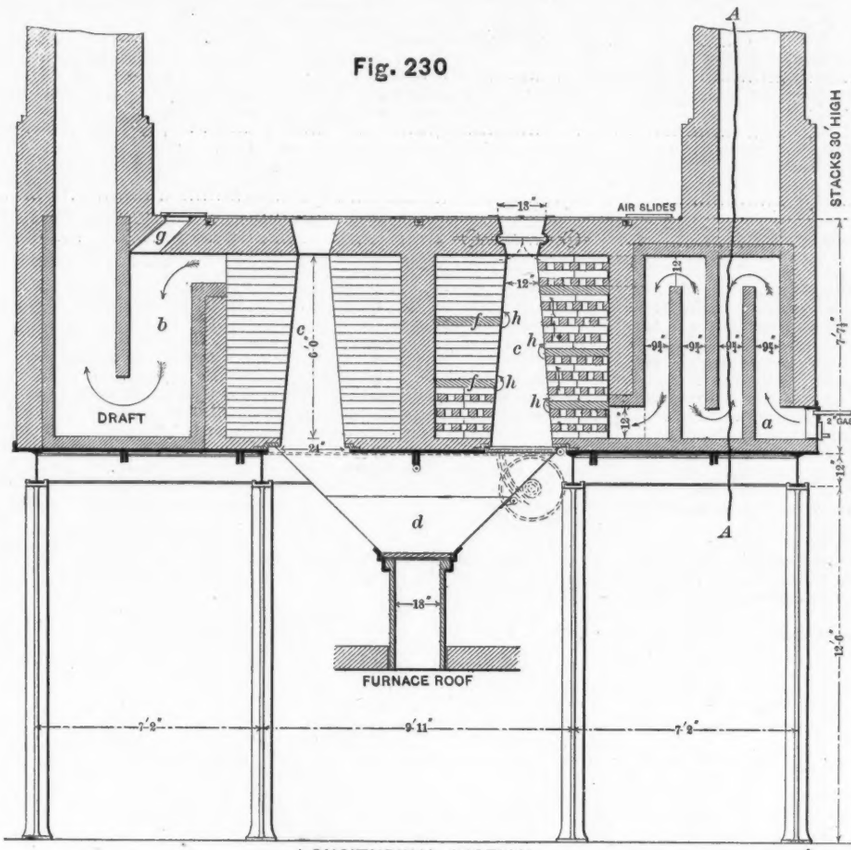
*The furnace.*—The gas enters the lower part of each chamber *c* through a central flue *a* with baffling-walls, passes up through it, and escapes from its top into the two exit-flues *bb* which lead to the stack, and which also have baffling-walls, to retard the passage of the gas. As the gas enters these latter flues, it meets a current of air entering through the ports *g* and burns, part of the heat which it thus generates being conducted through the walls *e*, and thus heating the entering gas in the flue *a*.

Each chamber *c* has on two sides of the ore column a mass of checkerwork, containing several baffling walls *f*.

Before charging the ore, air and gas burn in *c*, preheating the checkerwork. When the ore is charged later, it is in turn heated by this checkerwork, partly directly, partly by means of the gas which alone is now passed through *c*, and which, circulating through checkerwork and ore-column, furthers the transfer of heat. This device for heating the ore is good, but one would think that it might advantageously be supplemented or even replaced by an arrangement for preheating the ore by direct contact with solid fuel in a kiln, such as is used for roasting iron ore; thence the hot ore could be raised to, or even (by perching the kiln aloft, like the cupolas in a Bessemer plant) dropped into the chamber *c*. The fuel consumption should in this case be decidedly less than in the Adams furnace. Indeed, one fears that the repeated shocks of the successive charges of ore dropped into the chamber *c* may seriously injure the checkerwork. Or, retaining the checkerwork, a little air might be admitted with the gas for a short while after charging the ore, so that their combustion, occurring in contact with the ore, might heat it, and so lessen the quantity of heat which it is necessary to store up in the checkerwork.

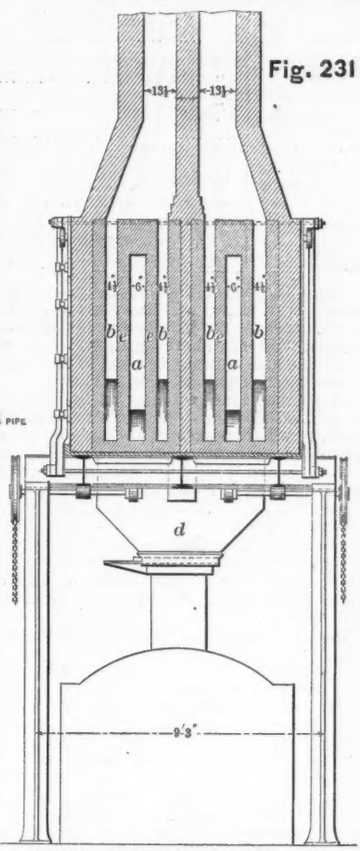
A further disadvantage of the checkerwork is that it probably prevents the gas from passing uniformly through the column of ore, and so implies using a greater excess of gas than would otherwise be needed to effect a given degree of reduction. As the checkerwork offers much less resistance to the passage of the gas than the column of ore does, the gas would pass directly through the nearer checkerwork (the right-hand one shown at the right-hand end of Fig. 230) from entrance to exit-flues, were it not for the baffling-walls *f*. These divert the current of gas into the ore column. The path of least resistance then will be a sinuous one, passing upwards through the right-hand regenerator, with a short ex-

Fig. 230



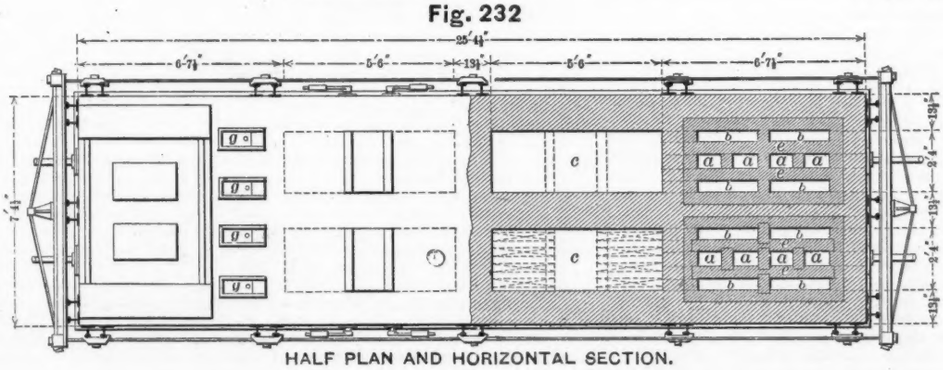

LONGITUDINAL SECTION.

Fig. 231




CROSS SECTION ON LINE *A A*.

Fig. 232




HALF PLAN AND HORIZONTAL SECTION.

THE ADAMS FURNACE.

*a*, gas inlet flues.
*b*, exit flues for products of combustion.
*c*, chambers in which the ore is heated and reduced.
*d*, hopper leading to the open-hearth furnace.
*e*, partition walls between inlet and exit flues.
*f*, baffling-wall.
*g*, air inlet flue.
*h*, path of least resistance for gas.

* From appendix to second edition of Howe's "Metallurgy of Steel."
† U. S. Patent, Chas. Adams, July 8th, 1890.

TABLE 224.—ESTIMATED COST OF MAKING ONE TON (2,240 POUNDS) OF OPEN-HEARTH STEEL INGOTS IN PITTSBURGH IN 1890.

| ITEM. | RATE, ETC. | Using Adams sponge, making 18 heats per week. Loss, 7% on pig, 15·2% on sponge; average loss, 12¼%. | | Using "pig and scrap," making 12 heats per week. Loss, 7% on gross weight of charge. | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Making steel of "common," i. e., inferior quality. | | Making soft steel of fair quality. | | Making steel of exceptionally good quality. | |
| | | Weight. | Amount. | Weight. | Amount. | Weight. | Amount. | Weight. | Amount. |
| 1. Sponge | Charged at the rate of $0.12 per "unit" or 22·4 pounds of iron in the ore, the cost of reduction being included in item 6. | 1,707 lbs. = .761 tons. | $9.14 | | | | | | |
| 2. Pig-iron | Cost of 1 ton of iron in ore $12.00 | 858 lbs. = .381 tons. | 7.52 | 1,204 lbs. = .5375 tons. | $10.58 | 1,204 lbs. = 0.5375 tons. | $10.58 | | |
| | " conversion into pig-iron 7.69 | | | | | | | | |
| | " 2,240 pounds of pig-iron $19.69 | | | | | | | | |
| 3. Scrap-iron | $21.50 | | | 1,204 lbs. = .5375 tons. | 11.56 | | | | |
| 4. Puddled (muck) bar | Cost of 2,240 lbs. of pig-iron, as above. 19.69 | | | | | | | | |
| | " puddling 11.00 | | | | | 1,204 lbs. = 0.5375 tons. | 16.50 | | |
| | " 2,240 lbs. of muck-bar $30.69 | | | | | | | | |
| 5. Special low-phosphorus material. | 33.00 | | | | | | | 2,408 lbs. = 1.075 tons | $35.47 |
| 6. Other costs of the open-hearth process. | Making 18 heats per week, and including cost of fuel and labor for the reducing furnace, and a charge of $0.20 per ton of sponge for interest and repairs thereto, per ton of ingots 7.50 | | 7.50 | | | | | | |
| | Making 12 heats per week 8.00 | | | | 8.00 | | 8.00 | | 8.00 |
| | Total cost of 2,240 pounds of ingots | | $24.16 | | $30.14 | | $35.08 | | $43.47 |

cursion into the ore-column opposite each baffling-wall, as sketched by the curved arrows *h* in Fig. 230. For the gas that works across the lower part of the ore-column by diffusion, the path of least resistance will also be upwards, with like short excursions around the ends of the left-hand baffling-walls, and with a tendency to the right, towards the exit flue. Along these paths of least resistance, and especially along the first, gas will pass in excess; and we must rely on the slow process of diffusion and on eddying, rather than on direct currents, for the reduction of those lumps of ore which lie away from the ends of the baffling-walls.

It is claimed that the gas shoots across the apparatus in a zigzag course from one compartment of the regenerators to that diagonally opposite. This could be the path of least resistance only if the thickness of the baffling-walls *f* bore a much greater ratio to that of the ore column than is shown in Fig. 230.

In order that the checkerwork should have sufficient heat to raise the ore to, say, 800 degrees C (and it is probable that at least this temperature should be reached if reduction is to be rapid), I estimate that the gross volume of checkerwork, voids included, should be about thrice that of the ore chamber.

The plan for recovering the energy in the waste gases escaping from the ore column by burning them in a recuperative apparatus in which they heat the in-coming gas is also good. Its simplicity and compactness should, I think, more than compensate for its evident disadvantages as compared with the reversing-regenerative or Siemens system. Indeed, one published drawing of the apparatus has the Siemens system.

These disadvantages are that, thanks to the low thermal conductivity of brickwork, the transfer, and hence the recovery of heat must be far less complete than in the Siemens system, in which the very surface of brick that receives the heat during one phase, and hence the hottest part of the brickwork during the subsequent phase comes directly in contact with the gases to be heated; and that there is danger of short-circuiting, *i. e.* of the in-coming gas passing direct from the inlet to the exit-flues through cracks in the partitions.

These disadvantages of the recuperative as compared with the regenerative system are, indeed, exaggerated in the Adams furnace. For, in common recuperative furnaces the flame itself gives up much of its heat directly to the charge of metal, etc., which is to be heated, and we only attempt to pass through the brick partitions the remainder of the heat left in the waste gases after they have escaped from the chamber in which the charge of metal, etc., is. But in the Adams furnace the combustion itself does not occur till after the gas has left the ore, and none of the heat which it generates can reach the ore without being filtered through the brick partitions from the exit to the entrance flues. Thus, as far as the heating efficiency of the gas as it leaves the ore is concerned, the apparatus stands on a par with a direct-fired muffle, or a clay-pipe hot-blast oven, rather than with a continuously regenerative, *i. e.*, recuperative reverberatory.

The tendency to short-circuiting, too, must be considerably increased by the resistance which the compact ore column offers to the passage of the gas. Given cracks of a certain size leading from inlet to exit flues, the quantity of gas which short-circuits through them must increase with the resistance which the normal or desired path offers to the passage of gas. These cracks should be extremely slight in a new furnace, increasing with the movements due to expansion and contraction on heating and cooling, and growing the more rapidly as time goes on; the gas which filters through them burning at their very mouths and causing local expansion, to be followed later by contraction, with its well-known racking effect.

Extended experience alone can decide what weight to attach to this objection. In case natural or other smoky gas be used, its tendency to deposit carbon may choke incipient cracks, and long postpone, or even permanently prevent, serious short-circuiting.

*The cost* of an Adams reducing furnace large enough to supply 180 tons of sponge a week, which is the requirement of a 20-ton open-hearth furnace making 12 heats per week, and using three parts of sponge to one of pig-iron, is estimated at from $3,000 to $5,000 in addition to the cost of the open-hearth furnace itself.

THE OPERATION.—The chambers *c* being at bright redness, some coal or coke is charged, to take up the oxygen of any air that might draw in through the bottom joints; and on this the ore, which may be mixed with basic material (limestone, lime, dolomite, etc.) in case dephosphorization is sought, or with solid fuel to promote reduction. Gas alone is now passed through the ore column, regenerators and flues, till reduction is sufficiently advanced. It is stated that, if the largest lumps of ore be not larger than one's fist, this occupies but an hour, according to some, five hours according to others.

It is clearly not unnecessary, but in case of the first charges which are dropped into any given bath of cast iron, it may even be undesirable, that reduction be complete. The presence of a little oxygen, like the addition of ore in common open-hearth practice, will simply hasten the oxidation of the carbon and silicon present. It is also clear, however, that the more completely the ore is reduced, the larger the proportion of sponge to pig that may be used in the open-hearth furnace. If, as is claimed, sponge is cheaper than pig-iron, and if reduction really be nearly complete, there is no evident reason why four parts of sponge to one of pig may not be used in the open-hearth furnace, as in current Continental European practice with pig and scrap iron.

The open-hearth practice with sponge made by the Adams process of course must resemble that with sponge or blooms made by any other direct process, or with scrap-iron, being modified according to the thoroughness of reduction.

B. *The loss of iron* in the sponge-making and open-hearth processes combined cannot yet, I think, be given confidently. Those in charge of the process at Pittsburg estimate that, if not less than 25 parts of pig to 75 of sponge be used, about 87·5 parts of ingots will result. Charging against the pig a loss of 7 per cent. of its own weight, the loss from ore to ingots is, on this showing, 14·33 per 100 of iron in ore.

C. *Dephosphorization.*—It is claimed that, if the open-hearth slag be tapped immediately after melting each lot of ore, a considerable proportion of the phosphorus in the ore will be removed with it. The effect of this procedure on the loss of iron should be examined carefully. The following instances of dephosphorization are reported. The first is said to represent the sum of the experience at the Indianapolis works, where some 1,000 tons of ingots were made by this process.

| | Per cent. | | |
|---|---|---|---|
| Average proportion of phosphorus in the charge | 0·14 | 0·0525 | 0·048 |
| Proportion of phosphorus in the ingots | ·055 to ·123 | 0·042 | 0·032 |
| Difference | 0·017 to 0·085 | 0·0105 | 0·016 |

D. *Difficulties.*—When so large a quantity of ore is dropped at once into the bath, we anticipate that it must rest directly on the hearth; and any unreduced oxide contained in the lower part of the charge would thus have an exceptionally good opportunity to corrode the bottom. I am informed that this difficulty did arise at first; but that it has been overcome. The fact that the gas attacks the bottom of the ore column first, and therefore while its reducing power is at a maximum, tends to assure thorough reduction in this part. To this same end the smaller lumps may be charged at the bottom of the chamber, and may be mixed with solid fuel; indeed, the solid fuel actually charged in the reducing chamber before the ore, should assist in overcoming this difficulty.

One would anticipate that the natural gas used, which, when heated, deposits carbon so readily, would tend to choke up the ore column. Any deposit of carbon in the entrance-flues would probably be burnt off when air and gas were later admitted for heating the chamber for the following charge.

I have already pointed out the apparent danger to the checkerwork from dropping heavy charges of ore into the reducing chamber *c*.

COST OF SPONGE-MAKING.—The following data are published, based on experience with the process at Indianapolis:

*Cost of converting one ton of iron in a 65 per cent. ore into sponge, by the Adams process.*

| | | |
|---|---|---|
| Coal mixed with the ore | 0·165 tons. | |
| Coal burnt in the gas-producers | 0·060 " | |
| | 0·225 tons @ $0 89 | $0.20 |
| Labor, repairs, etc | | 0.84 |
| Total | | $1.04 |

From some preliminary comparative estimates of the cost of making open-hearth steel, A, with pig-iron and Adams sponge, and, B, by the common pig-and-scrap process, which have been published, I condense the appended table. The only assumptions which might be thought to affect the validity of the comparison seriously are those of the loss on the sponge, which cannot yet, I think, be given confidently; and the charge of $7.50 per ton of ingots for the costs, other than for ferrous material, for the Adams reducing and the open-hearth processes combined, against that of $8 per ton of ingots for the open-hearth process when equal parts of pig and scrap are used. It is held that the saving in the open-hearth process, due to making three heats per 24 hours with pig and sponge while only

two per 24 hours are made with equal parts of pig and scrap, more than compensates for the extra cost of the reducing operation in the Adams furnace. While it is not clear to me that this claim can be sustained, it probably is not far enough from the truth to mislead seriously. The more important question is that of the loss.

SUMMARY.—The arrangements for heating the ore and for recovering the heat, potential and sensible, in the waste gases are good, though in both respects a decided but perhaps wise sacrifice of heat efficiency has been made to secure a simplicity and compactness which must be praised. Those for recovering the sensible heat in the spongy product and for preventing the re-oxidation can hardly be excelled. Of the other difficulties of the direct process, absorption of sulphur is avoided in Pittsburg by using natural gas, and is indeed more readily controlled with a gaseous than with a solid reducing agent; the outlay for labor should be moderate; and as the sponge is discharged directly into the open-hearth bath, heterogeneousness, carburization and slightly imperfect deoxidation (unless by cutting the bottom of the open-hearth furnace) do relatively little harm. The weak point of the system I take to be the mode of heating the ore; but this can be readily modified.

On the whole, I think that if we except the apparent liability of the regenerators to injury, this is as yet the most intelligent design for the direct process; but, as the experimental stage has not been passed, we have still to see whether it will fulfill its promise.

## THE IRON-ORES OF THE UNITED STATES.*

Having been honored by a request to prepare for this occasion some account of the iron ores on which a great industry has been built up in the United States, and moreover, to make such a record of our present knowledge as may be of value alike to our distinguished guests from abroad and to my colleagues of the American Institute of Mining Engineers, I had at first some doubts how best to approach the task. That among my hearers are many better fitted to discuss the question of our iron ores from commercial and economic points of view, I am well aware; but I have thought that my studies, chemical, mineralogical and geological, continued during a period of more than forty years, and covering a wider field than those of any other observer, would enable me to present the theme under a somewhat novel aspect, and, moreover, to connect it with geological and geographical facts which will give to the description a permanent value. To this end, it is evident that the great coal fields and their relations to the iron ores of the more ancient rocks have to be carefully kept in view.

Over nine and a half million tons of pig iron were produced in the United States during the year ending June 30, 1890, including about half a million of tons from imported ores. Of the nine millions, in round numbers, 99 per cent. were made from ores mined to the east of the Mississippi, and the remainder, with insignificant exceptions, in the State of Missouri, near the western bank of that great river. The supply of native ores is, therefore, essentially from the eastern portion of our country. From the Mississippi stretching westward to the frontier range of the Rocky Mountains, and in that great mountain range itself, are treasures alike of iron and coal which await development; while still further west, the vast American basin, and its Pacific mountain belt, have as yet attracted attention chiefly for their rich stores of gold, silver, copper and mercury.

Up to the present time, then, it may be said that the iron industry of the United States is confined to the great region drained by the Mississippi and Ohio and their tributary rivers southward toward the Gulf, by the northern chain of lakes discharged by the St. Lawrence, and to the Atlantic mountain belt, whose drainage waters find their way by more direct channels to the Atlantic. The great physical features of this eastern half of the North American continent are remarkable. Between the eastern front of the Cordilleras in Colorado, and the mountains of the Atlantic belt and the Appalachians, which stretch from New England and eastern New York to Alabama, spreads a vast region, traversed by navigable rivers, from Lake Superior southward to the Gulf of Mexico and eastward to the Gulf of St. Lawrence. In one place alone is the great Atlantic barrier broken. This is where the tidal and navigable waters of the Hudson River pass through the Highlands, and, permitted by the sinking away of the Appalachians in southern New York, connect the waters of the Hudson, through the Erie canal, with those of Lake Erie, and through Lake Champlain with the St. Lawrence, affording a system of internal navigation which must always give to the city of New York a commercial supremacy on eastern shores.

Geologically speaking, the structure of this great interior region is as simple as it is geographically. Nowhere, perhaps, in the old world are the areas of the principal geological groups so widely extended, nowhere else are displayed such large and accessible coal fields. The ancient crystalline rocks which, while they constitute the Atlantic belt, skirt the northern borders of the Great Lakes and the St. Lawrence Valley, and to the westward form the range of the Cordilleras, are rich in valuable iron ores. Small areas of these older iron-bearing rocks rise like islets among the younger strata in Missouri, and in Texas; while the great Appalachian Valley, itself abounding in ores of iron, stretches along the western base of the Atlantic belt, which it divides from the parallel Appalachian or Allegheny mountain range. The coal-measures themselves, in various parts of their distribution, moreover, abound in ores of iron.

Without here entering into details, it should be said that the important coal-basins of the region in question are all of Paleozoic age; the small basins of newer coals in eastern Virginia and North Carolina, and farther westward, being of little account in the present connection. In like manner, the iron ores of the region may be said to be Paleozoic or still more ancient. The extensive areas of Mesozoic and Cenozoic rocks in our territory, so far as known, furnish little or no iron ore; the small portions of tertiary strata with lignite, ochres and hydrous iron ores, at intervals from Vermont southward along the Appalachian Valley, being of geological rather than of economic interest. In the early days of our history small deposits of bog ore were wrought in many places, but have long since lost their importance. Mention, however, should here be made of the magnetic iron sands, which have a certain historic interest. Found along the shores of Connecticut, the sands early attracted attention in England under the name of the American sand iron, and in 1763 were noticed alike by the Royal Society of London and the Society of Arts. The sand was even manufactured into malleable iron in a furnace on the Connecticut coast, which was probably a German bloomery. Attempts to work similar sands in the Gulf of St. Lawrence and on Long Island, N. Y., have been made in our time without pecuniary success.†

Passing over these preliminaries, we may now proceed to describe the principal iron-ore horizons of the United States in geological succession, beginning with those of the ancient crystalline rocks which, as they underlie the Paleozoic, have been variously designated as Eozoic, Archæan and Primary. These rocks, as the result of lifelong studies, we have been led to divide into several distinct groups or terranes, which appear to have a definite order in the earth's crust, and, moreover, to sustain constant relations to their contained iron ores, thus giving to these divisions not only universal application but great economic importance. Without entering at length into questions of theoretical geology, it may be said in a few words that we reject for these ancient crystalline rocks alike the so-called metamorphic and igneous hypotheses of their origin, believing them to have been formed at definite and distinct periods in the world's earlier history, through the intervention of water, but under conditions widely different from those of later sediments.‡ We, moreover, reject as untenable the notion of the igneous origin of the iron ores themselves, which appear to be in all cases deposited from water, generally contemporaneous with the inclosing rocks, but more rarely by subsequent processes in fissures, after the manner of mineral veins.

The great divisions of these stratiform crystalline rocks are designated as follows in ascending order: Laurentian, Norian, Arvonian, Huronian, Montalban and Taconian.§ The succession is, however, frequently incomplete from the local absence of one or more of the intermediate divisions. The first of these divisions, named from the Laurentide mountains, north of the St. Lawrence, includes also the greater part of the Adirondacks, the Highlands of the Hudson, and the continuation of these along the so-called South Mountain or Blue Ridge, into the Carolinas. We have predominant in this terrane a peculiar type of granitoid gneiss, with highly-inclined stratification, sometimes associated with crystalline limestones in certain portions, and including, in beds and lenticular masses conformable to the stratification, great deposits of iron ore, generally magnetic, which are extensively mined in the Adirondacks to the west of Lake Champlain, and further southward at intervals along the Atlantic belt at least into North Carolina. To this most ancient horizon also belong the similar rocks and ores in Canada, to the north of the St. Lawrence and of Lake Ontario.

These Laurentian magnetites are sometimes exceedingly pure, but at other times they include phosphate of lime, which, in the form of crystalline apatite, marks, in one locality on Lake Champlain, the planes of stratification of the ore. This impurity, however, is of rare occurrence. Iron pyrites is not unfrequently so abundant as to render a preliminary roasting of the ore necessary, and combined titanium-oxide is sometimes found, though not, so far as known in this terrane, in such amount as to unfit the ores for use in the blast-furnace. The occasional occurrence of disseminated scales of graphite in these Laurentian magnetites is a fact of mineralogical interest, and the presence of intermingled calcite, quartz, orthoclase, pyroxene, and other silicates, notably a chloritic mineral, may be noted. Crystalline specular hematite sometimes replaces the magnetite in these Laurentian rocks. Mention may here be made of franklinite, a mineral resembling magnetite, but including besides the oxide of iron those of manganese and zinc. It is, moreover, generally accompanied by crystaline red zinc oxide. This ore, elsewhere a mineralogical rarity, is mined to some extent in the Laurentian in New Jersey, and, after yielding its zinc by distillation, is smelted, yielding a manganesian alloy or spiegeleisen.

Next in ascending order among the Eozoic terranes we have placed the Norian series, so called from the predominance therin of great masses of stratiform norite, a rock essentially composed of labradorite or some closely related feldspar. These norites are, however, not unaccompanied with gneisses and limestones like those of the older Laurentian, on which the Norian is found to rest unconformably in many localities. So far as known, the iron ores of this series are highly titanic, and though sometimes holding an admixture of magnetite, are often destitute of magnetism, being a pure ilmenite or menacannite, and in some cases containing an excess of titanic oxide in the form of crystalline grains, apparently of rutile. These ores, though sometimes abundant, are thus, in the present state of our iron industry, of little value. They abound in areas of Norian rock in the Adirondack region in Essex county, New York, and have been found under similar conditions in the Black Hills of Wyoming and in various parts of Canada, notably at the Bay of Seven Islands, on Lake St. John, and at Bay St. Paul near Quebec, where an unprofitable attempt was made to smelt them a few years since. Similar ores are found in the Norian rocks in the Isle of Skye, and in Norway, in which country, and in England, they have been smelted to some extent, when not too titaniferous, in admixture with other ores, or else with addition of great amounts of flux. The magnetic ores of Scandinavia occur, so far as known, in a gneissic series apparently identical with the Laurentian.

Third in the ascending series of crystalline terranes we have placed the Arvonian, which may be described as a stratified petrosilex, either jaspery or porphyritic in character, apparently the same as with

*A paper read by T. Sterry Hunt, M.A., LL.D., F.R.S., New York City, at the International Session, Pittsburg, October, 1890.

† Those who are curious to follow the details of this history will find it told at length by the writer in the Report Geological Survey of Canada for 1867-69, pp. 261-269, 280-284. See further J. M. Swank, "Iron in All Ages," p. 97, for the early trials in Connecticut.

‡ An extended statement of the writer's views on this subject will be found in an "Essay on the Origin of Crystalline Rocks and the Cronitic Hypothesis," in his volume entitled "Mineral Physiology and Physiography," pp. 68-189. Editions 1886 and 1890.

§ "Mineral Physiology and Physiography," pp. 403-425; also Report E, Second Geological Survey of Pennsylvania, *passim*.

what is called hälleflinta in Sweden, and associated with quartzites, certain argillites, greenish fine-grained schistose rocks, and more rarely with crystalline limestones. To this horizon belong the remarkable varieties of magnetite and red hematite mined at the Iron mountain, Shepard's mountain and Pilot Knob in Missouri. I have examined areas of these same rocks in Wisconsin, along the north shore of Lake Superior, in the crystalline belt known as Green Ridge to the west of Gettysburg in Pennsylvania, and at many points along the New England coast from near Boston to the Bay of Funday, and further east in the Cobequid hills; noting occasionally the occurence of iron ores like those of Missouri, which at points in Maine and in Nova Scotia may assume an economic importance. This series, which was by C. H. Hitchcock included in the base of the Huronian, is also well developed in Sweden and in North Wales, where it was designated by Hicks as Arvonian.

Passing over the Huronian proper for a moment, only to return to it again, we notice the great terrane which includes the younger gneisses, and the fine-grained granulites and mica-schists of the White mountain series, which we have designated Montalban. Widely developed in New England, it underlies the city of New York, there resting directly upon the Laurentian gneiss of the Highlands, which is itself seen in the northern parts of the city. The Montalban is well displayed in and around Philadelphia, and forms a large portion of the Blue Ridge throughout its southern extension. Remarkable for granitic veins sometimes carrying tin and other rarer elements, the Montalban abounds in many parts with deposits of iron pyrites, often cupriferous, but is not rich in iron oxides, though including in some localities beds of magnetite.

The Huronian series itself demands special notice because great deposits of certain iron ores now believed to belong to the distinct Taconian or Taconic series (about to be considered at length) were for a long time referred by geologists to this horizon. The Huronian, a great terrane marked by characteristic serpentinic, dioritic, chloritic and epidotic rocks, and including important deposits of sulphureted copper ores, contains, it is true, more or less hematite and magnetite, in some cases at least with considerable admixtures of titanium, and also carries chromic iron ores, which in various parts of its distribution are of economic importance. The immense deposits of magnetic and specular iron ores in the vicinity of the great lakes in rocks formerly called Huronian, are however to the best of the writer's judgment to be referred to the Taconian.

The study of this series brings us back to the eastern part of the United States, and to the region already defined as the Appalachian valley, lying along the southwestern border of the great Atlantic belt, and traceable from western Vermont as far southward as Alabama. From an early time in the history of American iron-working, the importance as a source of iron of the brown ores of that region was recognized, and they were smelted more than a century since in western Connecticut and in Pennsylvania. These hydrous ores, for the most part limonite, and generally known as brown hematite, are found imbedded in soft deposits more or less clay-like in character, and consisting of certain crystalline schists altered and greatly softened *in situ* by chemical changes, often to a depth of 100 feet or more. These folded and inclined strata which have been sheltered from erosion by the belt of older crystalline rocks along their border, merit an especial study alike for themselves and for the ore deposits which they include. The similarity in form, distribution and mode of occurrence of these hydrous ores is well known to those engaged in the mining of them, and may be advantageously studied in parts of western New England and in Duchess county, N. Y., in portions of New Jersey, and throughout the great Appalachian valley in Pennsylvania and farther southwards, where they are also associated in many places with anhydrous oxydized ores—magnetite and red hematite. The nature of all these deposits, but especially of the hydrous ores and their decayed strata, as well as their geological age, has been the subject of much vague speculation and unfortunately of great misconception on the part of many geologists, nor is it too much to say that an adequate solution of the problems thus raised involves many difficult questions alike of chemistry, of mineralogy and of geological stratigraphy, which go far to explain the confusion still existing, and which we shall endeavor briefly to explain.

(TO BE CONCLUDED.)

**The First Siamese Railway.**—In our Indian mail we find that a German company has got the contract for the first Siamese railway. The line will be 165 miles long from Bangkok to Korah. German rails and machinery will be used, and German engineers will be mostly appointed. Mr. Bathze, in charge of the work, promises to lay the line down for one million sterling.

**A Substitute for Platinum Wire in Incandescent Lamps.**—The report is current that an English chemist has discovered a practical method of dispensing with platinum wire in the manufacture of incandescent lamps. On investigation, says *The Electrician*, it appears that this rumor has substantial foundation. In view of the rapid rise in the price of platinum such a discovery would be very important.

**Electric Ploughing.**—An installation for the purpose of ploughing the land by electric motors has been set up on property belonging to the Marquis de la Laguna, of Spain. The power of a water-wheel of about 20 H.P. will be employed, and the implement for working the land is expected to work at a distance of three miles from the generating dynamo. A deficiency of mechanical and agricultural knowledge on the part of those entrusted with the work seems likely to make this trial a failure.

**Chemically Pure Zinc.**—According to *l'Electricien*, M. Cahaigne, of Paris, has succeeded in producing chemically pure zinc on a commercial scale and at a price but little higher than that of ordinary zinc. MM. Pouchard, Mathioux & Co., makers of electric clocks, have used Cahaigne zinc rods in the Leclanché cells employed by them. The cells in question furnished current for about 90 hours, and the consumption of chemically pure zinc amounted to 28 grams per cell, while the consumption of ordinary well amalgamated zincs amounted to 36 to 38 grams. The Cahaigne zinc was, moreover, uniformly consumed, while the amalgamated rods were very irregularly attacked.

**Daylight Enhancer.**—Mr. W. Hennig has manufactured an apparatus which consists in a large mirror which, solidly framed, is fastened in medium height in front of a window; it is made to turn round and is placed in an inclined angle and throws much of the outside light into the interior of the house. Though similar mirrors have been used formerly, to improve the light in dark rooms in Berlin, Hennig's mirrors produce a much stronger light, caused by better compositioned glass and by its being properly cut and by the hermetically closed backside of the mirror, which protects it from the influence of hurtful steam, vapors and moisture. In the hotel where it is in use the passage behind the room is sufficiently lit by this apparatus through a milk-glass pane. The price of the apparatus is not small, but the expenses are said to be recovered within one year by the economy of the artificial lighting during several hours a day.

**Experiments with Explosives.**—At the Cymmer colliery a series of interesting experiments were recently made with explosives. In the first experiments 8 ounces of carbonite were exploded; in the second, 16 ounces of compressed powder; in the third, 8 ounces of roburite; in the fourth, 8 ounces of ammonite; in the fifth, 8 ounces of securite; and in the sixth, carbonite organ was used, but only 6 ounces. Experiments were also made with other explosives. A mixture of gas, coal dust and air, blended in the most explosive proportions, was formed, and in this the charges were fired by electricity. In the first and sixth of the experiments first mentioned the firing of the charges did not explode the explosive mixture; in all the others the mixture was exploded. At present the miners are debarred from the use of explosives, because the flame ignites mixtures of gas and dust. In a series consisting of 72 explosions of carbonite only one fired the mixture. That result was thought to be satisfactory; and the future of carbonite seems to be pretty well assured. The only explosive agent that approaches carbonite is the water cartridge.

**Responsibility of Employer for Safe Appliances.**—A mining company which employs a superintendent to hire and discharge the men and furnish them with supplies, is responsible for his negligence, and notice to him is notice to the company. Where a company undertakes to supply its miners with fuse it is charged with the duty of furnishing good fuse, and where notice is given to the superintendent that fuse supplied to a miner is bad, and he tells him to do the best he can with what he has until more can be secured, the company is responsible in damages for injuries sustained by the miner, if he is injured while using the defective fuse with the degree of care which its condition would impose upon a prudent man.

*Eureka Mining Co. v. Bass, Supreme Court of Alabama*, 8 *South.*, 216.

**Engine and Boilers as Fixtures.**—Under the statutes of Colorado, an engine placed on a frame bolted to timbers which were sunk in the ground and the earth tamped around them, and a boiler set on rock work, the ordinary connections being made between the two, become fixtures and a part of the realty and not subject to execution as personal property.

*Roseville Alta Mining Co. v. Iowa Gulch Mining Co., Supreme Court of Colorado*, 24 *Pac. Rep.*, 921.

**Estimation of Metallic Aluminum in Commercial Aluminum.**—Mr. G. Klemp treats a weighed quantity of the aluminum to be tested with a solution of potassium hydrate, and determines the quantity of hydrogen that is evolved either by measuring the volume of the gas or weighing the water produced by burning it. In the first case most of the ordinary gas analysis apparatus may be used, especially Lunge's improved apparatus. In the second case the apparatus described by R. Fresenius for his zinc-dust estimation is suitable.

In testing the applicability of the method the author has used Fresenius' apparatus. He employs a solution of caustic potash that contains 35 grams of KOH per 100 cc. The aluminum is disintegrated with a file and the filings weighed in a weighing tube, about one gram of them then shaken into an Erlenmeyer's flask of about 150 cc. capacity, and the tube again weighed. The aluminum is covered with a little water, and some vaseline is added to prevent frothing. The hydrogen evolved by the caustic potash solution is burned in a Fresenius apparatus and collected in concentrated sulphuric acid. To prevent a too rapid evolution of hydrogen the caustic solution is added in small quantities. The aluminum takes about three-quarters of an hour to dissolve and, to expel the last portions of hydrogen, the liquid is warmed toward the end of the reaction.

A sample tested by this method gave 98·42 per cent. and 98·37 per cent. of aluminum; the same sample tested gravimetrically by precipitation with ammonia and ammonium chloride, and deducting the iron precipitated at the same time, gave 98·14 and 98·31 per cent. of aluminum.—*Zeits. Anal. Chem.*, 29, 388–390.—*Journal of the Society of Chemical Industry.*

## PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent Office:

TUESDAY, NOVEMBER 18th, 1890.

440,617. Apparatus for Charging Retorts. Frederick Bredel, New York, N. Y.
440,634. Separator Machine. Noah W. Holt, Manchester, Mich.
440,674. Bed Plate for Steam Engines. Henry C. White, New York, N. Y.
440,680. Wire Drawing Machine. George Wirth, Gratz, Austria-Hungary.
440,688. Power Transmitting Mechanism. Warren S. Belding, Chicago, Ill.
440,715. Precipitator for Impurities in Exhaust Steam. Charles A. MacDonald, Chicago, Ill., Assignor to the Hercules Iron Works, same place.
440,745. Rock Drilling Machine. Eugene Moreau, Philadelphia, Pa., Assignor to Theodore W. Sterling, New York, N. Y.
440,746. Car Coupling. George B. Pointer, Middletown, Assignor of one-half to Edwin Irving Bell, Portland, Conn.
440,757. Valve for Steam Engines. Herbert N. Gale, Bristol, Conn.
440,776. Electric Motor. Harry B. Pullman, Cambridge, O., Assignor of three-fourths to Charles D. Robbins and Harrison O. Patch, both of Washington, Pa.
440,797. Machine for Cutting, Expanding, and Beading Boiler Flues. Allen Vail Buffalo, N. Y.
440,863. Rod Mill Plant. Irving A. Kilmer, Newburg, N. Y.
440,864. Universal Steam Joint. Henry T. Knight, South Riverside, Cal.
440,872. Tubular Boiler. Nelson S. Bowdish and Edward R. Bowdish, Skaneateles, N. Y.
440,920. Feeder for Roller Mills. Levi Lash, Waverly, Mo.
440,965. Steam Engine Valve. Joshua Rose, Twinkenham, England.
440,968. Carbonizing Apparatus. Adolph Silverberg and Cunibert Detering, Bedburg, Germany.
441,043. Underground Wire System. Edmond Verstraete, St. Louis, Mo., Assignor of one-half to Peter M. Kling and George J. Kobusch, same place.
441,055. Hydraulic Dredging Apparatus. Henry W. Brown, Cambridge, Mass.
441,060. Process of Magnetically Concentrating Ore. Gordon Conkling, Glens Falls, N. Y.
441,089. Amalgamator. James B. Brewster, New York, N. Y.

## PERSONAL.

Mr. H. J. Stanley has been appointed city engineer of Cincinnati, O., vice Mr. J. A. Stewart.

Mr. T. V. Powderly was re-elected Grand Master Workman of the Knights of Labor, at the general assembly of that order held in Denver, Colo., this week.

Mr. Wm. B. Manier, superintendent of the Gilbert Car Works, Troy, N. Y., has taken a similar position with the Northern Car Shops, Minneapolis, Minn.

Messrs. Dusham & Paine, consulting engineers, have removed their offices to New York from Cleveland, O. They can be found at Room 31, No. 150 Broadway.

W. F. Dixon, who for some years has been connected with the Cooke Locomotive Works, has become chief draughtsman for the Rogers Locomotive Works.

Mr. P. Hopkin, formerly connected with the Catasauqua Manufacturing Company, Catasauqua, Pa., is now general manager of the Slatington Rolling Mill Company, Slatington, Pa.

Dr. Francis Wyatt, the well known chemist of this city, announces the dissolution of his partnership with Dr. A. Weingaertner. Dr. Wyatt will continue the business at his laboratory, 24 Park Place.

Mr. Henry Brett, chief Clerk of the Tamarack Mining Company, at Calumet, Mich., according to the Marquette *Mining Journal*, has resigned to take the assistant clerkship of the Calumet and Hecla Mining Company.

Mr. C. E. Webster, lately chief engineer of the Schuylkill & Lehigh Valley Railroad Company, has been appointed assistant chief engineer of the Lehigh Valley Railroad Company, with headquarters at South Bethlehem, Pa.

Gen. John B. Newton was formally invited at a recent meeting of the Board of Commissioners having in charge the construction of a canal from Chicago River to the Mississippi River to act as the supervising or consulting engineer.

Mr. Daniel P. Burnham, of Chicago, Ill., has been appointed chief of the construction bureau of the Columbian Exposition. He will superintend the construction of the building and organize the bureaus of engineering. architecture, landscape gardening and sanitation.

A movement is now being made for organizing the civil and mining engineers, mine and furnace owners and managers, chemists and metallurgists, geologists, and all others interested in the material progress of the State of Alabama, into a society for the promotion of the scientific examination and discussion of practical, everyday affairs, and for this purpose a meeting will be held at the University of Alabama, at Tuscaloosa, December 12th, at 7:30 p. m.

## OBITUARY.

Leonard Gardner died on the 16th inst. at South Weymouth, Mass., of paralysis, aged 81 years. He was an eminent mathematician, and gained great celebrity a few years ago by his calculations on the transit of Venus.

Capt. Joseph Vivian died at Penzance, England, on the 3d inst., aged seventy-four years. In former years he held the agency of the Roskear mine. Just prior to his death he was connected with mines in the Argentine Republic.

William M. Denny, a prominent broker of the Spokane Falls, Wash., Mining Exchange, committed suicide on the 12th instant. Financial loss, it is said, induced the rash act. Mr. Denny was about 50 years of age, and a pioneer of the Pacific Northwest.

Daniel Runkle died at Paterson, N. J., on the 17th, of pneumonia, aged 67 years. At the time of his death he was president and treasurer of the Warren Foundry, a pipe producing establishment at Phillipsburg, and was president of the corporation of Runkle, Smith & Co., a construction company in New York.

John H. Van Vechton, of Port Jervis, N. Y., died at the New York Hospital on the 6th inst. from the effects of a surgical operation, aged sixty-eight years. For eleven years he was master mechanic of the New York, Pennsylvania & Ohio Railroad Company's shops at Meadville, Pa., and for seventeen years master mechanic of the Erie Railroad Company's shops at Port Jervis.

## INDUSTRIAL NOTES.

The strike of the granite cutters at Concord, N. H., seems approaching a settlement, arbitration having been agreed upon by both parties.

The Slatington Rolling Mill Company, of Slatington, Pa., has completed its rolling mill and begun the production of muck bar. The mill will make merchant iron this month.

According to reports Pueblo and Denver, Colo., capitalists have organized a stock company having a capital of $500,000, $400,000 of which will be paid in, for the purpose of manufacturing white lead by a new chemical process. The works will be located at Denver.

At a recent meeting of the stockholders of the Pennsylvania Steel Company, it was decided to issue new capital stock to the amount of $3,000,000, two-thirds of which is intended for the purchase of shipyards at Sparrow Point, on Chesapeake Bay, Md. The company intends to embark in the steel shipbuilding business.

The Centre Iron Company of Bellefonte, Pa., is temporarily embarrassed. The furnace was banked last week and will remain so until the meeting of the stockholders. It is very probable that all the existing difficulties will be adjusted at the meeting, and that the Centre Iron Company will continue to operate the works.

The Troy Steel and Iron Company, at Troy, N. Y., it is said has lately adopted the direct Bessemer process, successfully carrying the molten iron in ladles on a steamer from the furnaces on Breaker Island to the steel plant. Two of the blast furnaces are now being relined, the principal change being an increase in the size of the bosh.

The Pelton Water Wheel Company, of San Francisco, Cal., represents an active and promising industry, and one which is already assuming large proportions. It reports having sent out nearly 300 wheels since the first of the year, and that upward of 1,200 Pelton wheels are now in successful operation. These wheels are sent to every civilized country on the globe.

The United States Cold Rolling Mill Company, it is said, has purchased 1,000 acres of land in the vicinity of Hammon, Ind., and is about to erect thereupon a plant for the drawing of wire from cold bar, which will employ 500 men. The stock of the company is placed at $1,000,000. Mr. T. B. Bryan and Mr. Frank Wells are among the principal stockholders.

The Isabella No. 3 furnace, located at Etna, Pa., was blown in on the 17th inst. Work on this furnace was started in March, 1889. About 300 tons of steel plates have been used in its construction. The blowing engine was made by the E. P. Allis Company, of Milwaukee. The furnace's capacity will be 200 tons in 24 hours to be produced in four castings.

The Pennsylvania Railroad Company is erecting an elevated structure one mile long and four tracks wide for the passenger traffic at its Jersey City terminus. The iron work, which was made and erected by the Pencoyd Iron Works, is immense in proportions, and a fine piece of accurate and substantial construction. The whole is now being covered with silica graphite paint furnished by the Joseph Dixon Crucible Company, of Jersey City, which, it is claimed, successfully resists all chemical and atmospherical changes.

The Westinghouse Air Brake Company in the United States Court on the 19th inst. began a suit against the New York Air Brake Company and its directors for alleged infringements on patents styled the "Fluid Pressure Automatic Brake Mechanism," "Air Valves for Power Brakes" and "Air Brake Valves." These patents George Westinghouse, Jr., claims to be the owner and original inventor of, and he asks that the defendants be enjoined from manufacturing these patented articles and be made to pay over all the profits they have thus far unlawfully derived from their sale.

The blast furnace of Shoenberger, Speer & Co., of Pittsburg, Pa., is about to go into blast after having been increased to 75 feet in height and relined. The other furnace is running regularly, and will continue to do so, in all probability, until next summer, when it, too, will be increased in height. A slight delay was occasioned last week in the Bessemer department by the breaking of a steel pinion, which had only been running three months. An iron pinion was put in its stead. The iron buildings adding to the plant will soon be completed, when nearly every available inch of ground will be utilized, and most of it under cover.

Superintendent of Public Works Mr. Hanan and State Engineer Bogart has just concluded the annual inspection of the State canals, New York, and report them on the whole to be in fair condition. The locks along the Black River Canal were found to be so bad that there will have to be an appropriation sufficient to replace all of them, or the canal must be abandoned. The aqueducts over Schoharie Creek, on the Erie Canal, three in number, were found to be in a shaky condition so far as the trunks are concerned. These trunks are of wood, and were built many years ago, The masonry is sound. This work will require over $100,000.

The Denver Water Company, Beaver Brook Water Company and the Mountain Water Company, all of Colorado, have consolidated under the name of the Denver City Water Works. The capital stock is placed at $7,000,000, divided into 70,000 shares. Of this number 20,000 shares, or $2,000,000 of the stock, is set aside as preferred stock, and will command over the common stock seven per cent. cumulative dividends out of the net earnings of the company. The objects of the organization, according to the articles of incorporation, are to secure and operate all rights and apparatus pertaining to water-works in the counties of Arapahoe, Jefferson and Douglas, Colo. The officers of the company are: W. P. Robinson, president; J. H. Pullen, vice-president; M. A. Wheeler, secretary, and C. B. Rhodes, treasurer. These officers, together with W. F. Hawes, W. F. McCue, Jr., N. H. King, Philip Feldhauser and J. C. Montgomery, constitute the board of directors.

### CHICAGO INDUSTRIAL NOTES.

(From our Special Correspondent.)

KENWOOD BRIDGE WORKS.—The latest addition to the industrial plants of Grand Crossing, Seventy-fifth street, has commenced active operations. The company has completed factories on grounds adjoining the tracks of the Fort Wayne railroad. The bridge company has just finished the main factory building, and will employ about 200 men in the manufacture of structural iron.

The JOURNAL of August 16th last briefly described the then projected Cold Storage Exchange. The corner-stone of this monster building is now laid, and its completion will be pushed forward with all dispatch possible. The buildings now going up will consist of two main warehouses, each 10 stories high and 70 × 382 feet and 82 × 382 feet, one fronting on the river railroad tracks, by which six leading roads can be reached, running between the two buildings, arched over by the West Water street arcade, in which will be rooms for offices. The estimated cost of the entire plant and buildings to cover all the property lying between West Lake and West Randolph streets, on both sides of West Water street to Cold Storage Place, including the viaduct and arcade and the purchase of the present warehouse, valued at $140,000, is $1,390,000. The estimate on steam plant, elevating and electric service, refrigerating and ice plant, is $475,000; total $1,865,000. A Produce Exchange will be erected in connection with the warehouse, equipped with all latest conveniences for the use of the trade. This will be composed of iron and glass, and so located as to command a view of West Water street arcade from end to end. The dimensions of this arcade will be 75×382 feet; Cold Storage Place arcade, 36 ×382 feet; height of buildings above river level, 127 feet; total number of square feet available for offices, 20,628; total number of square feet available for stores, 95,590; total cubic contents of buildings, 6,659,622 cubic feet; frontage on Lake street, 225 feet; frontage on Randolph street, 225 feet; frontage on Chicago river and dockage, 382 feet; frontage on Cold Storage Place, 382 feet; combined frontage on West Water street arcade 764 feet; combined frontage of buildings on West Water street and side trackage operated by six railroads, 764 feet; total 3,124 feet, making upward of a half-mile of frontage available for shipping and receiving freight; total capacity available for storage purposes, 3,000,000 cubic feet; 850,000 feet of pipe will be used, and the total capacity of boiler and machinery plant, 1,600 horse power. Capacity of refrigerating plant equivalent to 600 tons of melting ice per day, and 200 tons of pure crystal ice.

### SOUTHERN INDUSTRIAL NOTES.

(From our Special Correspondent.)

The Dallas Manufacturing Company has recently been organized at Huntsville, Ala. T. B. Dallas will be the business manager. A cotton factory costing $1,000,000 is to be erected by the company, the buildings for which will be commenced early in January. New York and Baltimore capitalists are among the investors.

The Hartsfeld Furnace and Refining Company has been organized at Newport, Ky., for the purpose of smelting and refining precious metals. Herman Nagel has been elected president, George Hildebrande, vice-president, and William Lampe, secretary.

J. P. Witherow & Co., of Pittsburg, Pa., are building the basic steel plant for the Watts Iron and Steel Syndicate, Ltd., of London, at Middlesborough, Ky. Its capacity is to be 350 tons per day.

The Buena Vista Steel Company has been incorporated for the purpose of building a steel plant at Buena Vista, Va. C. M. Clark, of Philadelphia, has been elected president, A. T. Barclay, vice-president, and G. F. Baker, secretary. The capital stock is $250,000, with privilege of increasing to $1,000,000.

The Pennsylvania Investment Company has been incorporated for the purpose of dealing in real estate, manufacturing, mining, etc., in the vicinity of Buena Vista, Va.; S. F. Kelly has been elected president and O. S. Kelly secretary. The capital stock is $30,000, with the privilege of increasing to $150,000.

To the industries of Salem, Va., are to be added a $100,000 car works, a $100,000 rolling mill, a $75,000 muck bar mill, a $75,000 cotton factory and a $50,000 iron works. The land and development companies of that city have combined to secure these plants.

## MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

**If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.**

**Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.**

**No charge will be made for these services.**

**We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.**

**These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.**

### GOODS WANTED AT HOME.

**1,147.** Twine making machinery, that will make heavy brown twine from flax, 4 strands, and sewing twine from hemp, 4 strands; also state whether the same machinery will make twines of cotton and of various weights of hemp, flax and cotton. Give particulars of cost, capacity, weight and of power and space required. Illinois.

**1,148.** Price lists and circulars of venetian blinds. Florida.

**1,149.** A complete brick-making and tanning outfit. North Carolina.

**1,150.** Two engines, a saw mill, steam pumps, steam drills, barrel machinery, hoisting machinery, etc., for a company that is going in the lime business on a large scale. South Carolina.

**1,151.** Lathe, planer, drill press, chain pulleys, emery wheels and cutting saws; also ladle of six tons capacity and other general steel foundry supplies. Pennsylvania.

**1,152.** A second-hand ten-stamp mill. Massachusetts.

**1,153.** A steam hoister to carry stone from quarry to top of lime kilns on an incline iron track; also a steam drill. South Carolina.

**1,154.** A good machine to cut barrel heads from undressed lumber; a machine for jointing, chamfering, crossing and leveling staves; also a hoop machine for making hoops. South Carolina

**1,155.** Material for building a railroad two miles long. South Carolina.

**1,156.** A prominent gas and water company wants to correspond with manufacturers of dynamos and erectors of electric light plants. West Virginia.

**1,157.** The best and latest improved brick machinery. North Carolina.

**1,158.** A standpipe 100×12 feet, either material ready for erection or complete; a compound duplex pump, 500,000 gallons per 24 hours, against 125 pounds pressure, with 85 feet piston speed per minute; about 1,000 feet 8-inch pipe, 800 feet 6 inch pipe, and 5,000 feet 4-in. pipe; 25 hydrants, 8 gates; 1 boiler, 14 feet×48 inches; 1 feed pump for same and 1 heater. Specifications furnished on application. Texas.

**1,160.** Flint stones for a glaze mill, or a glaze mill complete, such as are used in potteries for grinding glazes. Ohio.

**1,161.** A second-hand pump in first-class order to deliver about twelve hundred gallons of water per minute at a speed of 100 feet of piston per minute. Georgia.

**1,162.** A good second-hand core diamond drill with outfit complete. Virginia.

**1,163.** A machine for making jack screws from 1¼ to 5½ inch screws.

### AMERICAN GOODS WANTED ABROAD.

**1,159.** Catalogues, price lists, etc., of water wheels. Japan.

**1,164.** A double machine for punching and shearing for a watch factory to punch a two-inch hole through ¼-inch brass or nickel and sharp angled smaller watch parts requiring a nicely adjusted machine, and also to shear brass or nickel bands 2½ inches deep. Switzerland.

## GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including November 12th were as follows:

| | Tons. 1890. | Tons. 1889. |
|---|---|---|
| Marquette, Marquette District | 1,283,695 | 1,355,759 |
| St. Ignace, " | 15,911 | 51,260 |
| Gladstone, Marquette District | 6,183 | 20,597 |
| " Menominee " | 73,317 | 47,653 |
| Escanaba, Marquette " | 1,201,732 | 951,817 |
| " Menominee " | 1,915,069 | 1,582,518 |
| " Gogebic " | 313,282 | 278,032 |
| Ashland, " " | 2,065,133 | 1,452,906 |
| Two Harbors' Vermillion District | *858,547 | 818,251 |
| Total, tons | 7,732,269 | 6,558,793 |

*Up to Oct. 30th.

## ALABAMA.

DORA.—This group of coal mines has been bought by a new company, organized to work them. J. T. Morgan, of Birmingham, is President; W. Tuttle, of Morganville, Ga., Vice-President, and R. E. Morgan, of Chattanooga, Tenn.,

## ARIZONA.

### PINAL COUNTY.

CENTRAL SILVER MINING COMPANY.—Mr. John B. Farish has taken charge of this company's smelter, for the purpose of making the endeavor to increase its bullion output. It is said that there are now 400 bars of bullion of 100 pound each on hand.

## CALIFORNIA.

### AMADOR COUNTY.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—Acting Superintendent Jones, writing under date of the 11th inst., says: "There is no change in No. 2 main tunnel. The vein in the tunnel running south from cross-cut No. 2 is about the same thickness, 10 or 12 inches. The rock is very rich; one can see gold in almost every piece." A telegram sent by Mr. Jones on the 19th inst. says: "The vein is two feet thick and looks well." We are enabled to publish this information exclusively through the courtesy of Mr. H. W. Lazelle, the popular secretary of the company.

## COLORADO.

(Special Report for the ENGINEERING AND MINING JOURNAL.)

Mineral surveys approved by the U. S. Surveyor General of Colorado during the week ending November 15th, 1890:

Survey No. 6,721; land district, Central City; name of claim, Silver Cliff and Silver Link lodes; 6,513, Durango, Weimar; 6,610, Leadville, Maximus and Roman; 6,659, Garfield, Old Reliable; 5,415, Durango, Faneta; 5,425, Durango, Toronto; 6,571, Leadville, Avalanche, Viliga, Onward, Olga, Hayden, Addie, Hoover, Delhi, Silver Bullion, Moter, Como and End; 6,686, Leadville, Mollie B. and Cleveland; 6,494, Gunnison, Leonidas; 6,703, Gunnison, Anna, Keene, Old Kentucky, Champion, Silent Friend, Gray Eagle, Bennett, Buckeye and Barns; 6,702, Gunnison, Tortees, Iron King, Silver Light, Electric Light, Calcium Light, Magnesium Light, Marble Claim No. 4, Marble Claim No. 3, Marble Claim No. 2, Marble Claim No. 1 and Marble Claim No. 5; 6,506, Gunnison, Alexander and Cyrus; 6,527, Leadville, Century; 6,553, Del Norte. Lake Shore.

### CLEAR CREEK COUNTY.

PAY ROCK CONSOLIDATED MINING COMPANY.—Secretary Carstarphen, secretary of the company, has received word from J. H. Platt, who is now in England, in regard to the sale of the property in London. It stated that the sale was to have been completed the 1st of the month, but the purchasers cabled for more time. This was refused unless the next payment, amounting to $35,000, was made. The solicitor of the new company, and some of the directors are expected to examine the property next month. For information concerning this new company see ENGINEERING AND MINING JOURNAL, vol. xlix., pp. 255, 712.

### LAKE COUNTY.

CHRYSOLITE SILVER MINING COMPANY.—Following is given an abstract of the report of this company for the year ending October 8th, 1890:

During the year there were shipped 4,216 1341/2000 tons of dry ore, for which was received $59,634.76, or $14.14 per ton, as against 2,987 525/2000 tons, sold for $31,143.52, or $10.43 per ton during the previous year.

The following statement shows the product in detail:

| | Dry weight. | Received per ton. | Cost per ton. | Profit. |
|---|---|---|---|---|
| | Tons.* | | | |
| Iron ore, company account | 463 | $6.66 | $6.44 | $97.53 |
| Iron ore, lessees' account | 2,737 | 5.47 | 10.42 | 10,186.70 |
| Mineral lessees' account | 105 | 234.92 | | |
| Iron ore, dump lessees' account | 831 | 7.14 | 14.14 | 3,608.04 |
| Concent. and ore, dump lessees' acc't. | 78 | 138.24 | | |
| | 4,216 | $14.14 | $10.85 | $13,892.27 |

* Pounds not given.

In this vicinity there are large bodies of iron ore, in some instances non-argentiferous, and again carrying from a trace to three ounces of silver to the ton. In addition to this work some prospecting has been done in the old mine works. During the year 1,142 feet of drifting, gophering, winzing and upraising have been driven on company account, costing as follows: Labor, $5,459.96; fuel, $390.75; timbers, $419.09; ammunition, $243.55; lights, $134.73; lubricants, $42.75; hardware, $273.48; assaying, $65.60; surveying, $149; total, $7,178.91. In addition to the above there have been three shafts sunk by lessees aggregating 307 feet in depth. The mill property is idle.

The profit on the iron ore mined on company account was but three per cent. This very small margin is owing to the fact that a great deal of development work was charged to mining iron account. Since March last no iron has been mined on company account. The net profit derived from underground leases on iron ore and mineral was 25 5/10 per cent., the royalties on iron ore being 15 and 20 per cent., according to grade, and on mineral 30 per cent. The net profit derived from dump leases was 21 1/10 per cent., the royalty on iron ore being 15 per cent. and on concentrates and mineral 25 per cent.

All dump work has been done under lease. All shipments yielded 76,414 ounces of silver and 132,158 pounds of lead, being an average of 18·1 ounces of silver per dry ton and 1·5 per cent. lead. The total shipments of the company to date amount to 118,912 820/2000 tons gross or 105,453 1718/2000 tons dry weight, yielding 4,968,301 ounces of silver and 31,195,576 pounds of lead, for which the company has received $4,502,637.78, being an average of 47·1 ounces of silver per dry ton and 14·8 per cent. lead, and an average price received per dry ton of $42.70.

The main prospecting work done during the year has been between Vulture No. 4 shaft and Vulture No. 7 shaft on and near the Vulture and New Discovery lines. This work, in so far as the discovery of valuable ore is concerned, has been entirely unsuccessful.

The receipts have been as follows: Sales of ore, 4,216 1341/2000 tons, $59,634.76; sales of supplies, etc., account mining expense, $3,178.21; sales of supplies, etc., account dump leases, $75; sales of supplies, etc., account Chrysolite mill, $1,374.18; interest on reserve fund, $394.02; total receipts, $64,656.17.

The expenditures have been as follows: Mining expenses, $42,080.52; mining iron, $2,988.77; dump leases, $13,205.32; Chrysolite mill, $1,870.25; general expenses, $3,950.51; rent, salary and taxes, $1,842.09; total, $65,919.32.

The assets are: Cash, $16,276.62; property account $9,999,500; purchased property account, $334,209.99; building, machinery, supplies, etc., $32,842.30; total, $10,382,848.91.

Liabilities: Capital stock, $10,000,000; profit and loss account, $382,848.91; total, $10,382,848.91.

DORRIS.—A contract for additional sinking of the shaft 25 feet has been let. This will bring the shaft sufficiently below the chutes of ore known to exist at that point, so that any question of dip will be at once solved. In the tunnel on the west end of this claim the lessees have made a strike of good carbonate ore, the assays from which give 22 ounces in silver and 15 per cent. in lead to the ton. The old streak in the tunnel was followed to the southwest, where it was found to open out into this stuff, and is also found to gradually widen.

LITTLE VINNIE.—It is reported that this claim will start up very soon. It will be remembered that when the work stopped this shaft was just about breaking into the contact. This development will furnish data to a number of properties in the immediate vicinity that are prepared to resume work if the contact proves remunerative.

NISI PRIUS.—Messrs. Shuford and Stecker, the lessees of this mine, have started a new tunnel to intersect at a much lower depth than their present outlet the ore chute upon which they have been working for the past six months. They expect to reach the chute inside of 150 feet, and will then be in a position to handle the ore with greater facility and economy than from the old workings, higher up on Rock Hill. This new tunnel runs a few feet from the west side line of the property controlled by the Lucky Joe people.

WOLFTONE MINING COMPANY.—The main shaft on this property has been repaired preparatory to a resumption of operations. It is the intention of the management to work the ground to the south of the shaft from the bottom or 665-foot level, and to prospect in that direction for a new chute of the same class of ore that is thought to come through that portion of the claim. Bodies of good mill dirt, or concentrating ore, are disclosed in these workings, and will be mined at once. The mill is being placed in thorough order and complete shape to start up very shortly. The contract to sink a new shaft 500 feet north of the present shaft has been let. It calls for a 4½ × 14-foot shaft, to be divided into two hoisting and a pump line compartment, and to be 600 feet deep.

### LA PLATA COUNTY.

Land Commissioner Groff has rendered a decision in the case of the Golden Chicken lode claim and the Index lode claim, both located in the Durango land district. The application for a patent for the first named lode was filed November 10th, 1887, the original location having been made October 18th, 1885. The Index claim was located June 24th, 1878, and the application for a patent made October 27th, 1883. The survey of the Golden Chicken conflicts on the northwest end to the extent of about 250 feet on the assumed line of the lode with the Index lode. By the decision the Golden Chicken entry is held for cancellation to the extent of the conflict with the Index lode.

(From our Special Correspondent.)

DURANGO, Nov. 15.

Ground has been surveyed for a large concentrating plant which is to be erected at this point by the owners of certain properties near Silverton and at Rico. It may include a sampler. It has not been fully decided what machinery will be used. The San Juan & New York Smelting Company's works are in full blast, and will be forced

to add some additional furnaces soon, as their supply of ores are continually increasing. One great advantage these works have over many others is their immense coal bank, which furnishes a fine quality of coke at a reasonable price. Old dumps in the mine are being worked over and used for a flux. Over $2 per ton is cleared by the work. There are extensive placer diggings some 22 miles west of here, in the California mining district. There existence is being kept quiet. They will be fully opened in the spring. Some of the nuggets are said to be as large as a good-sized pea, and were panned from a very small space. More work in placer mining will be done in the southern portion of the State next season than ever before. Durango is rapidly recovering from its disastrous fire, and, as it is full of live business men, its future is assured.

OURAY COUNTY.

(From our Special Correspondent.)

OURAY, Colo., Nov. 15, 1890.

There has been a scarcity of cars in this section for some time past; even by a use of a large number of "extras" required to haul in the large quantities of winter stocks necessary for the miners, there still remains considerable ore, the owners of which are desirous to market. The output so far this year is more than double in gross tonnage that of last, and in value will prove about two-thirds more. This is partly owing to the increased number of concentrating mills, samplers and the increased activity of ore buyers, the ore being of a very desirable quality, and also to the low rate on low grade ores allowed by the D. & R. G. R. R. There are quite a number of new mills under contract and which are being contemplated, that will materially increase the output. Messrs. Scott & Co. have broken ground for a very large and complete plant under the Warne process. It will be built as perfect as possible. Very few mines will entirely shut down. The large producers are making their preparations for considerable extra work as well as to ship all ore possible. Development work upon prospects will be greater than ever, and the general outlook is more encouraging for large and increased demand for properties. The new railroad to Rico is being built as rapidly as possible, and will be of great benefit to this section of our State.

PITKIN COUNTY.

The Aspen public tram, the Durant tram, the Taylor and Brunton sampler, the Aspen tram, the Beach and Percy, and Driver samplers were idle the first of this week on account of a continued scarcity of cars. This condition of affairs was caused by stretching rails on the Rio Grande, the consequent moving out of all narrow gauge rolling stock and the non-arrival of broad gauge cars. The result was to almost stagnate business at the mines and smelters.

PARK REGENT.—This mine was recently started up after a shut down of several weeks. During the period of idleness the shaft was relined and an air drill plant put in. At present the daily output is twenty-five tons of ore, running sixty ounces of silver to the ton. The opening up of the ore in this mine, it is said, shows the continuity of the great ore chute of that part of the mountain, and has an important bearing upon the value of the Bushwhacker Company's adjoining property.

RED JACKET MINING COMPANY.—This company, operated by St. Louis capitalists, has leased the Wilton Belle mine. The lease stipulates that $800 a month for the first three months be expended on the property. Mr. Magee is the manager. This company is also operating the Little Friend mine on Aspen Mountain, from which, it is said, good ore is being taken.

SAN JUAN COUNTY.

The Titusville mill was started on September 15th, 1890. It is now about completed. The main building is 40 feet wide and 95 feet long, terraced in the hillside, and with a fall of 54 feet between the crusher and the bumping table floor. The machinery consists of 1 Blake crusher, 2 sets Cornish rolls, 4 sizing screens, 7 Hartz' jigs, 2 automatic feeders, 10 stamps, 650 pounds 90 drop, 4 Gilt-edge Gilpin County bumping tables, 1 steam ore dryer.

FANNY AND PHILADELPHIA.—These two mines which lie side by side have been worked under a lease by O. A. Nelson. The season's output has been 15 cars of ore which will run 200 ounces of silver to the ton. A crosscut is now being run to cut the vein of the Little Fanny at a lower point, and will open up a good deal of ground for next season's operations.

SUNNYSIDE.—Notwithstanding the fact that the mill has been stopped, this extension is being worked. Seven hundred feet of contract work has been let, and will be completed before spring. Of this 300 feet is to complete the crosscut, 160 feet of shafting to connect therewith and on the upper level 140 feet to connect with the No Name. This will develop the ore body to a depth of over 500 feet.

(From our Special Correspondent.)

SILVERTON, Nov. 15, 1890.

The output from this section of the San Juan has been equally as good as any other portion this past season. The outlook for an increased one next year is very bright. Winter work will be carried on on a large scale, a great amount of dead work being under consideration and contract.

One of the most complete stamp mills of the San Juan country is the new ten-stamp mill at Silver Lake, six miles north of Silverton, built and owned by Mr. Edward G. Stroiber, of Silverton. The machinery consists of one crusher and three-eighth compartment jigs, two sets of rolls, four revolving screens, ten stamps and two bumping tables, one 10 × 18 Tangye Buckeye 60 H. P. engine, one Barr duplex pump having a capacity of 150 gallons per minute, one No. 5 Stillwell heater, and one 92 H. P. water tube safety boiler. The boiler is built with a down take flue and is connected with the stack by a 4-in. × 20-in. iron drying floor for concentrates. Water is pumped from the lake into two 3,000-gallon tanks located on the crusher floor. The ore is handled automatically through a shoot from the second level to the ore house, and from the ore house by a covered tramway to the mill. The mill was designed by Bowers & Miller, of Denver, and built by W. M. Frey, of Leadville.

SUMMIT COUNTY.

SULTANA GOLD AND SILVER MINING COMPANY.—This company, which was incorporated in East St. Louis, Ill., August, 1888, with a capital of $1,000,000, has filed copies of the incorporation papers with the Secretary of State. The company proposes to begin actual operations in Breckenridge, where the mining property is situated, at an early date.

## IDAHO.

WASHINGTON COUNTY.

(From our Special Correspondent.)

October, 1890.

The camp of mineral is located 75 miles south of the Seven Devils. At this point Herbert Lang & Co. are operating a matting furnace. Oxidized iron ores from the Black Maria mine, mixed with iron sulphides are being treated. The ore runs 79 ounces silver; the working charges $16 per ton. Miners receive 80 per cent. of assay value of the silver. Coke costs $25 per ton. About ten tons of ore give a ton of iron sulphide matte. The furnace is a common 36-inch copper stack, and put up without regard to economy of labor or convenience in handling material. It treats about 19 tons of material in 24 hours. Twenty per cent. of lime is used. The cost of smelting aggregates about $8.40 per ton; cost of transportation to railroad, $8; freight to Denver, $12; working charges, $18. According to these figures a chloridizing mill with amalgamating pans would show a saving of $4 to $5 per ton, all things considered.

BLACK MARIA.—This mine, owned by Joe Pinckham and associates, of Boise City, is producing 15 tons of ore daily. A contract is made to furnish the smelter 4,000 tons. The mine is yielding a daily profit of $900.

PEACOCK.—This is the largest claim in the camp. It was located 28 years ago as a placer claim, from the surface of which a large amount of placer gold was taken. After being abandoned and relocated several times, a final location was made by a prospector named Allen. Later Governor Hauser and the Kleinsmiths of Helena obtained possession. An outcrop shows ore 400 feet in length and 200 in width. The openings have now extended over 15 or 20 feet. The general impression seems to be that it is a blanket vein. The formation on the west is syenite and quartzite, while the east wall is a soft white granite. A short distance to the east is a lime contact which extends south for some four miles, and forms a contact with granite. Along this contact some very good chimneys of ore have been discovered and considerable work done. Careful sampling, assaying and measurements, show about 14,000 tons of 17 per cent. copper ore in sight. The excessive costs of material and mining due to high attitude, and 9 feet of snow five months out of twelve make it anything but an inviting field on which to operate.

A claim adjoining the Peacock, known as the South Peacock was bought for $16,000. There is a shaft in an ore chimney 65 feet deep, the bottom of which contains 25 or 30 feet of snow and ice that has not been cleaned out for two years. Old miners say the shaft went through and out of ore. The 35 tons of ore taken from this property showed 30 per cent. copper, and an ounce or two in silver and a trace of gold. It is said that the property is being floated in Boston for $150,000.

Kleinsmith & Hauser management is building 15 miles of wagon road to the Peacock to connect with the steamer "Norma" on Snake River. A steamer has been built and will make regular trips in the spring.

SEVEN DEVILS RANGE.—Seven Devils, 90 miles due north of Huntington, are a high broken chain of mountains nearly 9,000 feet above sea-level. The mineral zone is about one mile wide by four miles long. Their composition is syenite, granite, porphry dykes, lime dykes and lava, the latter predominating.

## INDIANA.

The Chicago, Paxton & Cayuga Railroad Company, which was incorporated at Springfield, Ill., on the 14th, will, it is asserted, play an important part in the development of the coal beds which lie adjacent to the border line of Indiana and Illinois. The road is to be about fifty miles long. Cayuga, Ind., being the objective point. It will extend thence to Paxton, Ill., where connection will be made with Chicago by the Illinois Central.

## KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending November 15th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,910,880; zinc ore, pounds sold, 702,100; lead ore, pounds sold, 200,000; sales aggregated a total value of $14,424 and the total value of the output was $16,176.

## KENTUCKY.

Mr. C. J. Norwood, inspector of mines for the State of Kentucky, has kindly furnished us with a summary of his annual report, now on press. It is given following:

BITUMINOUS MINES.

Output of 71 mines for the six months ending June 30th, 1890. (A bushel = 80 pounds).

| | Bushels. |
|---|---|
| Lump | 11,873,752 |
| Nut | 3,446,016 |
| Run of mines | 5,141,759 |
| Mixed lump and nut | 3,910,810 |
| Pea | 951,991 |
| Slack | 1,617,034 |
| Miscellaneous | 1,864,627 |
| Total | 28,805,989 |

The average number of employés underground was 4,131. The maximum number employed at the mines was 6,701.

The output for the same period in 1889 was 25,669,403 bushels, showing an increase of 3,136,586 in favor of 1890.

The output of commercial coal for the year ending June 30, 1890, was 57,827,959 bushels. The product for the year ending on same date 1889 amounted to 55,359,488 bushels—showing an excess of 2,466,471 bushels in favor of 1890.

During the six months ending June 30, 1890, twenty mines shipped 11,138,854 bushels of coal to points outside the state.

CANNEL.—During the six months ending June 30, 1890, four cannel mines—two in Johnson County, one in Carter and one in Hancock, produced 27,682½ tons, nearly all of which was exported. These mines, the only ones worked for commercial purposes, gave employment to 221 persons underground.

The maximum number of persons employed at the bituminous and cannel mines during the year ending June 30 last was 7,000.

COKE.—The only ovens turning out coke were those of the Cumberland Valley Colliery Company, in the southeastern district, and the St. Bernard Coal Company, in the western district. The output for the six months ending June 30, 1890, was as follows:

| | Tons. |
|---|---|
| St. Bernard Coal Company, 45 ovens | 3,235 |
| Cumberland Valley Colliery Company, 75 ovens | 4,294 |
| Total | 7,529 |

The St. Bernard coke is made from washed slack. The Cumberland Valley Colliery product (known as "Pineville coke") is made from run of mines without washing or crushing.

## MICHIGAN.

COPPER.

The lake companies are shipping their copper to the East as fast as it can be obtained from the smelters in order to avail themselves of water rates. This week will probably close navigation in that section, and will find the companies with little or no stock on hand.

WOLVERINE MINING COMPANY.—This mine, says the Torch Lake *Times*, is being unwatered at a fair rate. In the early months of the new year the mine ought to be making a little copper. A new shaft, we hear, is to be sunk on the lode.

IRON—GOGEBIC RANGE.

IRON BELT.—This mine, located on the western end of the Gogebic range, has stopped lake shipments for the season and will stock its ore during the winter. The season's output was 105,505 tons. Recent diamond drill explorations on this property are said to have disclosed several promising lenses of ore.

MARQUETTE RANGE.

Frozen ore in the cars is giving some trouble on the ore docks just now. Salt water, heated by steam from the locomotive boilers, is used to thaw it.—*Marquette Mining Journal.*

WINTHROP.—A shaft has been commenced some distance south of the main workings, and is separated therefrom by one of the diorite bluffs so common to the region. Last year a shaft was sunk on this section of the property to a depth of 100 feet, being abandoned before the ore was reached. A diamond drill exploration which passed through 28 feet of ore has led to a resumption of operations. The formation on this side of the bluff dips south while the deposit in the old workings dips to the north.

## MISSOURI.

JASPER COUNTY.

(From our Special Correspondent.)

JOPLIN, Nov. 17.

The continued advance of the zinc ore market has caused a marked activity in the mines during the past week. The purchases made in this district by the smelters at Wales, as reported in our issue of November 8th, has caused the local buyers

to take almost every pound of ore in sight at from $30 to $32 per ton. The lead market is on the decline, the highest price now offered being $29 per thousand; heavy rains the latter part of the week somewhat reduced the output.

Following is the output from the different districts:

Joplin mines, 1,539,040 pounds zinc ore and 107,220 lead; value, $24,521.

Webb City mines, 535,280 pounds zinc ore and 73,000 lead; value, $9,609.

Carterville mines, 771,690 pounds zinc ore and 108,520 lead; value, $13,849.

Zincite mines, 97,140 pounds zinc ore and 6,390 lead; value, $1,582.

Oronogo mines, 43,270 pounds zinc ore and 10,000 lead; value, $894.

Galena, Kan., mines, 702,100 pounds zinc ore and 200,000 lead; value, $14,434.

All districts, total value, $64,878.

Chas. Matt & Co., of this city, are just in receipt of letters of inquiry about the zinc ores of the Joplin district from a smelting company in Belgium. We are informed that the Red Star Steamship Company has made a rate of $3.25 per ton of 2,240 pounds of zinc ores from New York to Antwerp. This speaks volumes for the future of the zinc mines of this district

On Zinc Hill, north of the Tuckahoe mines, a tract of undeveloped land has for some time been prospected. Last week a lead and zinc ore body was cut at a depth of 126 feet, and Saturday evening a depth of 135 feet in almost solid ore was reached.

The Snyder Bros.' ore bins are full of ore, owing to the scarcity of cars for shipment.

Mr. John Price Wetherell, vice-president of the Empire Zinc Company, of this city, arrived here last week in company with several of the stockholders from Philadelphia. The party called at the JOURNAL office and expressed themselves as more than pleased with the interest that the Joplin branch office of the ENGINEERING AND MINING JOURNAL is taking in the lead and zinc mines of this district. Mr. Wetherell stated that he could see a signal improvement in the prosperity of Joplin on each of his trips. As the party desired to see more of the country a hunting party was organized by Mr. Pat Murphy, who selected a point in the Indian Territory, near Caldwell, Kan., and made arrangements with Col. G. A. Thompson, the owner of a large cattle ranch near Caldwell, to meet the gentlemen with teams to convey them to the hunting grounds from the railway station. At the JOURNAL office soon dray wagons commenced to unload tents, rolls of blankets, boxes, barrels and small kegs, said to be used to store water while on desert lands. In this case, however, the demijohns and kegs had labels with the compliments of Capt. Teats, the proprietor of the Joplin Hotel. Judging from the amount of arms and ammunition the party carried, we expect that on its return the market will be overstocked with game of all kinds.

GREAT WESTERN LEAD AND ZINC COMPANY.—This company, three miles east of the city, reports a new strike of zinc ore at a depth of 80 feet.

LITTLE JOSIE MINE.—This property, on the Windsor Company's land, is running on full time, and last week it turned in 24,000 pounds zinc ore and 6,200 lead.

NORTON MINING COMPANY.—This company, operating southeast of Joplin City, has opened up a fine body of lead.

OSWEGO COMPANY.—This company turned in last week 100,000 pounds zinc ore and 53,000 lead.

## MONTANA.

### DEER LODGE COUNTY.

GRANITE MOUNTAIN MINING COMPANY.—There are reports of another important strike in this mine. Advises recently received by the company state that in level No. 13, east, ruby silver ore was showing and there were three feet of quartz.

### LEWIS & CLARKE COUNTY.

The Helena Mining Exchange held a meeting last week and wound up the affairs of the organization. This is said to be the second attempt made to maintain an exchange in that city.

### SILVER BOW COUNTY.

JERSEY BLUE.—A company has been organized to develop this mine at Butte. The directors are E. D. Bannister, E. W. Beattie, John T. Murphy, Angus McDonald, J. J. Nickey, Bryan Irvine and J. O. Hudnutt. The officers are E. D. Bannister, president; J. O. Hudnutt, vice-president; J. R. Anderson, secretary, and John T. Murphy, treasurer. The Jersey Blue is an old location and has been developed to a depth of 100 feet, from which point quantities of high grade ore have been taken from time to time. The ore chute is not deemed extensive enough to warrant further work on this level, however, and it is the purpose of the company to go to the 200 and possibly the 300 level before making any attempt at production.

MONITOR.—This mine, located south of the Harris-Lloyd and owned by T. D. Parry, William T. Lewis and others, has been leased and bonded to William Whiteman & Co. for $50,000, the time of the agreement being one year. The property has been in operation several months, and in the crosscut from the bottom of the 130-foot shaft a 15-foot body of ore has been opened up. Messrs. Whiteman & Co. are to sink the shaft to a depth of 400 feet, run crosscuts, etc., within the specified time, and will begin active operations at once.

## NEVADA.

### STOREY COUNTY—COMSTOCK LODE.

The following is the official statement of the yield of the mines of this county for the quarter ending September 30th, now on file with the County Assessor:

BELCHER MINING COMPANY.—Number of tons of ore worked, 3,400; gross yield, $62,968.86; cost of transportation, extraction and reduction, $66,327.75; no tax.

CHALLENGE MINING COMPANY.—Number of tons of ore worked, 402; gross yield, $6,024.34; cost of extraction, $16,523.79; cost of transportation, $402; cost of reduction, $2,412; no tax.

CONFIDENCE MINING COMPANY.—Number of tons of ore worked, 37; gross yield, $536.74; cost of extraction, —; cost of transportation, $37; cost of reduction, $222; no tax.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—Number of tons of ore worked, 22,934; gross yield, $327,712.95; cost of extraction, $173,609.57; cost of reduction and transportation, $160,542.13; no tax.

CONSOLIDATED IMPERIAL MINING COMPANY.—Number of tons of ore worked, 873; gross yield, $13,014.07; cost of extraction, $40,309.26; cost of transportation, $829; cost of reduction, $5,132; no tax.

CROWN POINT MINING COMPANY.—Number of tons of ore worked, 8,250; gross yield, $90,622.05; cost of transportation, extraction and reduction, $99,711.66; no tax.

JUSTICE MINING COMPANY.—Number of tons of ore worked, 2,600; gross yield, $60,815.97; cost of extraction and reduction, $55,437.30; tax, $268.93.

MONTE CRISTO MINING COMPANY.—Number of tons worked, 133; gross yield, $2,161.12; actual cost of extraction per ton, $4; cost of transportation, $82.13; cost of reduction, $631; tax (about), $24.

OVERMAN MINING COMPANY.—Number of tons of ore worked, 5,866; gross yield, $89,556.91; cost of extraction, $41,321.25; cost of transportion, $5,865.72; cost of reduction, $35,195.35; tax, $359.22.

YELLOW JACKET MINING COMPANY.—Number of tons of ore worked, 5,426; gross yield, $80,717.27; cost of extraction, $49,832.91; cost of transportation, $5,426.06; cost of reduction, $32,556.36; no tax.

The quarterly statements from the Chollar, Savage, Hale & Norcross, Potosi and Alta had not been filed up to the 15th inst.

## NEW MEXICO.

A dispatch from Fort Wingate states that the reported finding of rich gold prospects in the Carisso mountains of New Mexico is a matter of such importance that thorough investigations will be made in the coming spring. The mountains are in the northern part of New Mexico, about forty miles from the Colorado line. It is the intention of the department commander to recommend the employment of an expert miner and assayist to explore and prospect the country in question, with the assistance of United States troops. The mountains are on the Navajo reserve, and when this is done every assurance will be given the Navajos of fair intentions. This mountainous country is of no use to them for the grazing of their flocks and herds.

## NORTH CAROLINA.

### DAVIDSON COUNTY.

SILVER VALLEY MINING COMPANY.—In reference to the recent find of carbonate of lead, mentioned in a recent issue of the ENGINEERING AND MINING JOURNAL, the Superintendent reports it to be of very high grade, ranging up to 70 and 100 ounces of silver and six pennyweights of gold to the ton of 2 000 pounds.

### MONTGOMERY COUNTY.

THE APPALACHIAN COMPANY, LIMITED.—It is said that this company is having trouble with the Excelsior Iron Works, of Chicago, in regard to alleged defects in machinery. The case is now in the hands of a referee.

## OREGON.

### JACKSON COUNTY.

CENTENNIAL.—This quartz mine, below Willow springs, owned by Dr. Braden, has been leased this summer by C. M. Root and H. S. Sherrard, the latter acting as superintendent. It is stated that recently Sherrard disappeared, taking the amalgam from the plates with him. Dr. Braden has allowed the hands a ten day run of the mine for their indemnification, and will allow the other creditors the same time. The liabilities are $1,100.

## PENNSYLVANIA.

### COAL.

The work of putting out the Hill Farm fire has been suspended and the mine closed up again. Another bore hole has been drilled 425 feet in the coal, but it cannot be tapped until the mine is opened and drained of water.

John D. Boyle and Thomas Hacket have bought the Ridgeview coke works, in the Latrobe District. The plant consists of 80 ovens and 225 acres of coal. The price paid, it is said, was $75,000. A new company is to be organized to operate it.

Mine Inspector Austin King, of the Eighth bituminous coal district of Pennsylvania, in his 1889 report, gives the yearly average earnings of miners of his district at $311.04; the monthly earnings, $25.92; total output of coal, 5,215,946 tons; total number of men employed, 8,818; number of fatal accidents, 12; non-fatal, 42; average number of days worked, 110; average number of tons of coal produced during the year by each miner, 797·28.

COAL RIDGE.—The work of pumping water from this colliery at Mt. Carmel, Pa., was completed last week. The mine was flooded 17 years ago.

### OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to November 14th, were as follows:

| | 1890. Gals. | 1889. Gals. |
|---|---|---|
| From Boston | 2,277,564 | 4,298,103 |
| Philadelphia | 146,207,130 | 142,338,265 |
| Baltimore | 11,651,703 | 7,161,397 |
| Perth Amboy | 13,978,155 | 14,945,930 |
| New York | 404,207,672 | 388,884,659 |
| Total | 578,322,194 | 557,628,354 |

The Chief of the Bureau of Statistics reports the total values of the exports of mineral oils from the United States for the month of October, 1890, and during the 10 months ending October 31st, 1890, as compared with similar exports during the corresponding periods of the preceding year, as follows: October, 1890, $6,018,848; October, 1889, $4,916,764; 10 months ending October, 31st, 1890, $43,197,233; 10 months ending October 31st, 1889, $44,114,501.

## SOUTH DAKOTA.

### LAWRENCE COUNTY.

(From our Special Correspondent.)

DEADWOOD, November 18th.

A third barrel has been put in at the Deadwood Chlorination Works. This will enable the company to increase its daily capacity to 60 tons.

The Pyritic smelter, better known here as the "Baby," it is claimed is a success. On a recent visit the Messrs. Swift, of New York, who are the largest owners, they determined to erect a new plant near the old site with a smelting capacity of 120 tons daily. The site is now being prepared, but we hardly look to see the smelter in operation before next summer, owing to inclement winter weather in this region.

MIKADO MINING COMPANY.—A diamond drill is operating on the property southwest of and adjoining the Hannibal, belonging to the Mikado Mining Company. It is searching for a second contact. At the present writing a depth of 320 feet have been reached: Signs are said to be favorable.

### RUBY BASIN DRY ORE DISTRICT.

ROSS HANNIBAL MINING COMPANY.—The company's property is located in the Ruby Basin proper. A tunnel has been driven on the northeast side line with a southwesterly direction. Its length is 300 feet. One hundred and ten feet of this cuts through an ore body, which does not show a break or slip. Where the ore was first encountered it was quite narrow, but widened out regularly, until at the bottom of the discovery shaft, about 240 feet from entrance of the tunnel, it showed a thickness of 10 feet, which width it maintained for some 40 or 50 feet, and then commenced narrowing until at the end of the tunnel it assumed a form similar to the apex of a wedge. Two other shafts on the property, one 390 feet distant from the discovery shaft, are both in ore. A shaft on the Mikado Company's ground, 800 feet distant, and in the same direction, shows ore of a similar character and grade. In respect to the width of the ore body and its apparent continuity on this property, it differs from many others on this belt, where the ore is found in chutes from 20 to 85 feet wide, separated by dikes or horses of barren rock. The ore carries about 7½ per cent. sulphurets, which renders it very superior for pyritic smelting. The average yield is $29 per ton.

## UTAH.

### BEAVER COUNTY.

HORN SILVER MINING COMPANY.—Ore sales for September aggregate $30,000, and there were 1,100 tons on the dump unsold at the end of the month, which were not moved on account of lack of cars, otherwise sales would have been larger. Mr. Farnsworth, the manager of the company, writes that the output will be increased on account of the large quantity of ore exposed. A meeting of the board of directors will be held in this city next week.

### SALT LAKE COUNTY.

NIAGARA MINING COMPANY.—This company, of Salt Lake City and Bingham, held its second annual meeting in Salt Lake on the 12th inst. The following officers were elected: President and general manager, P. A. H. Franklin, of Ogden;

vice-president, George H. Dickerman, of Boston; treasurer, J. A. Palen, of Philadelphia; secretary, C. Howard Schemmerhorn, of Philadelphia; director, S. M. Preshaw, of Ogden. It is reported that the company has spent $400,000 since April in improving its properties. A 7 by 7-foot tunnel is being excavated two miles southwest from below the Forks, and is large enough for two tracks. Three shifts are working it daily. Hoisting works are being built preparatory to sinking a 5 by 12-foot shaft at the Utah mine, 1,000 feet in depth. The company has a group of over 50 claims at Bingham, and many others scattered over the north and west. The ores of the Bingham group are low grade concentrating ores.

SUMMIT COUNTY.

COMET AND CACTUS MINING COMPANIES.—A joint meeting of the stockholders of these companies was held in Salt Lake City on the 15th inst. The primary object of the meeting was to take action regarding the sale and transfer of the properties and interests situated within the territory, and to take action that might be deemed necessary for the dissolution of the former company, and the Cactus company to elect a new board of trustees to purchase interests, rights and properties of the company, the Comet smelting works; and also to consider the advisability of increasing the capital stock. The old board was re-elected. Inasmuch as two-thirds of the shareholders of the Comet company were not present, it was not dissolved.

UINTAH COUNTY.

VICTORIA COPPER MINING COMPANY.—This company has brought suit against William Haws and others. The plaintiff alleges that in 1887 Lewis P. Dyer and others located the Copper, the Ace and Antietam mining claims in Uintah County, and between that time and May, 1888, expended upward of $8,000 in developing the property. On June 10, 1889, William Haws, who had been employed by the defendants, and Heber Timothy wrongfully took possession of the property and ousted the plaintiff. The plaintiff therefore asks possession of the property, $25,000 damages, and that the defendant be restrained from interfering with the plaintiff in the possession of the property.

## WASHINGTON.

Messrs. John S. Anderson and John H. McGraw, of Seattle, Ore., and Edward Sikes, of San Francisco, Cal., are the incorporators of the Alta Railway Company, which has a capital stock of $100,000, and its object is the construction and operation of a railroad, from the mine of the Alta Coal Company, in sections 35 and 36, township 22 north, range 7 east, to such point or points as the company may determine. The company also claims the right to purchase and develop coal lands, enter and lay out a town site, establish a merchandise business, and do any and all other business compatible and connected with the business of coal mining. The principal place of business of the company is named as Tacoma.

## WISCONSIN.

ASHLAND COUNTY.

The announcement is made that copper rock has been found in Mellin, and that it is a continuation of the Keweenaw copper range. This is not at all improbable. It is a well-known fact that the copper formation which has made Michigan so famous extends southwest until it comes in contact with the Gogebic iron formation at a point not far north of Hurley, Ashland county, Wisconsin. Wherever this copper-bearing rock is found, it will also be possible to discover traces of copper. However, developments have proven that those sections which carry it in paying quantities lie many miles to the north of the present find.

## WYOMING.

ALBANY COUNTY.

(From our Special Correspondent.)

KEYSTONE, Wyoming, Oct. 21.

OTRAS MINING COMPANY.—Sixteen months have elapsed since the Keystone mine, together with 320 acres of placer ground, was purchased by the Otras Mining Company. Immediately after the purchase the company commenced extensive development, and erected a 20-stamp mill.

The Keystone mine was discovered in 1878, and up to 1889 had produced $75,000. The ore is a quartz stained with copper; about 60 per cent. of its gold value is free. The vein is a true fissure ranging from 18 inches to 10 feet in width. The main ore chute is 500 feet long. The main shaft is 220 feet deep with 3,500 feet of working levels. The gold value in the quartz ranges from a few dollars to two hundred per ton. The country rock is a gneiss very close grained and extremely hard to work, but when found undisturbed furnishes excellent walls. A double drum oscillating hoist handles the ore through a double shaft. All water in the mine is pumped from the main pump by a 7×14 Dean pump.

The stamp mill, which is furnished power by a 14½ globe Lafell turbine wheel, under 57 feet head of water, is a Fraser & Chalmers pattern. No. 33 mortars and 850-pound stamp. Challenge ore feeders are used and the tailings are passed over the new corrugated vanning machines, each machine handling the pulp from five stamps. The mill takes out about $100 in bullion, and from 800 to 1,600 pounds of concentrates per day.

The Otras company is also working the Florence mine under bond and lease. This mine is opened to a depth of 160 feet, having three levels; one at the surface extending into the hill 400 feet, one at 50 feet, 200 feet long, and one at 90 feet, 100 feet long. The vein is in granite, well defined and quite large. Quartz of a low grade is found in abundance, and upon the foot wall are found small pockets of white iron carrying from 16 to 30 ounces in gold. This rich iron is found at about 50 feet from the surface, and it is believed that the vein will widen with depth. At present a single miner often takes out from 200 to 400 pounds per shift. The Otras company is prepared to work all winter and will make preparations for extensive work as soon as the snow melts in the spring.

NATRONA COUNTY.

Reports state that a deal has been closed whereby the soda lake property, comprising 240 acres in this county, was transferred to English and French capitalists in consideration of $2,000,000.

At this lake the soda is found in the form of a sulphate necessitating only one process to convert it into a carbonate, thus reducing the cost 50 per cent. Baron Debesyne, who is at the head of the purchasing syndicate, is a large manufacturer of soda in France, and heavy English manufacturers are also interested in the deal. The syndicate will at once commence active operations, and, it is said, preliminary arrangements will shortly be made for the erection of a large manufacturing plant.

## FOREIGN MINING NEWS.

## AUSTRIA.

The mercury beds in Krain are supposed to extend from Idria over the territory of the Wippacher valley, for besides the small discovery made some time ago, a further discovery was recently made near Podagia. The ore which was here broken up shows good results.

## CANADA.

PROVINCE OF NOVA SCOTIA.

COAL.

(From our Special Correspondent.)

HALIFAX, Nov. 18.

ALBION.—The drifts into the cage pit seam at these mines are nearing completion. Many of the pits in Pictou County are short of cutters.

CAPE BRETON COMPANY.—Several cargoes of coal have been forwarded during the past week to New York and Boston, principally for gas purposes. Freights are reported at $1.75 to New York and $2 to Boston. Reference has been made to the explorations carried on during the past summer by the following companies:

GARDNER.—The Burchall Brothers have nearly unwatered this mine.

SYDNEY AND LOUISBERG COAL COMPANY.—Reference has been made to the explorations carried on during the last season by this company. The showing was so good that it has made arrangements to lease six square miles of coal lands from the Provincial Government. The agent of the company, Mr. D. S. Kennelly, leaves for New York and London, on business, it is reported, connected with a largely increased output next year.

GOLD.

Large blocks of ground continue to be applied for in the Brookfield and Stewiacke conglomerates.

At Gold River, Lunenburg County, it is reported that one of the long sought rich leads has been found, and promises over $200 to the ton.

CANADIAN SMELTING AND REFINING COMPANY.—This company, of Yarmouth, is seeking incorporation with a capital of $100,000, E. K. Spinney and E. F. Clements, of Yarmouth, being among the directors.

COLDSTREAM COMPANY.—This company's mill is now ready to receive the mortars, and should be completed by the end of the year.

ROYAL GOLD MINING COMPANY.—This company, of Whiteburn, Queens County, has applied for letters patent. The capital is $500,000, and C. Brown and A. Curtis, of Boston, and G. W. Johnston and Thos. Parker, of Nova Scotia, are provisional directors.

PROVINCE OF ONTARIO.

(From our Special Correspondent.)

PORT ARTHUR, Nov. 17.

Your correspondent was recently shown some rich specimens of silver ore taken from the surface of three new silver veins recently located in the 4th and 5th concessions of Crook's township. The veins are believed to be "true fissures," having an average width of four and one-half feet; the gangues of two of them being almost identical with the Silver Islet lode which lies about eighteen miles to the northeastward.

BADGER SILVER MINING COMPANY.—The mill has been closed for repairs and certain necessary enlargements. Silver ore averaging 90 to 300 ounces is being taken out of all the openings on this property. A few days ago another body of native silver was opened up in the breast of No. 1 level, west from No. 2 shaft, and at present writing is continuing. The vein is compact and well defined, the rich ore being regularly disseminated through the vein matter from wall to wall. The milling ore is accumulating very fast, showing the necessity of enlarging the present plant.

BEAVER MINING AND MILLING COMPANY.—Two carloads of smelting ore and concentrates, valued at $34,000, were shipped during October to the Newark Smelting and Refining Works, Newark, N. J. During the winter the main shaft will be sunk to a considerable depth below the present workings and more ground blocked out. Fifteen stopes are being worked. There is talk of building a newer and much larger mill in the spring.

OGEMA.—James Dickenson, editor of the South Florida *Progress*, was in the district last week making arrangements for the disposal of this property. He was accompanied by John Sixsmith, of Philadelphia, who made an exhaustive examination of the property and reported favorably upon it. This property is situated in the township of Dorion and comprises 80 acres. The lode has been described in these columns. It is under option to Sixsmith and others of Philadelphia, and now that the examination is said to have been satisfactory the sale is expected to go through without delay.

SHUNIAH-WEACHU MINES COMPANY.—A shipment of five tons of high grade smelting ore was made a few days ago. Captain Thompson is developing a new vein south of No. 1. An adit is being run on the course of the vein, and is encountering some good milling ore. Sinking and drifting is being prosecuted at No.'s 3 and 4 shafts.

A company has been formed with $100,000 capital, one-third of which has been paid in, and one-third allotted to the vendors. The remaining third will be kept in the treasury on joint account. The vendors also receive a cash consideration of about $30 per acre. As soon as all matters in connection with the transfer are completed mining operations will be commenced and pushed vigorously. The Ontario government is being asked to construct a wagon road from a point on Black Bay, near McEachern's Island, into the property. The Canadian Pacific Railway is distant about six miles.

WEST END MINING COMPANY.—This company has about finished all the necessary surface work preparatory to commencing operations on a large scale. Mining work has been carried on quietly since the late transfer of the property; about 37 miners having been employed. A new shaft has been sunk on the vein near the eastern boundary of the property; it is now at a depth of 55 feet, and has been in good milling ore for the last 45 feet. Capt. Wm. Rapsey is in charge of underground work, and H. N. Nichols, Superintendent.

PROVINCE OF QUEBEC.

An article was published in our last issue which related to the different asbestos mines of this province. It was given the caption of the "Scottish Canadian Asbestos Company, Limited," thus implying that it referred to this one company only.

## SOUTH AMERICA.

BOLIVIA.

Mining affairs would appear to be looking up, says the *South American Journal*, for the Mercedes, San José, Constancia, and some other mines at Condoriaco, have been transferred to an English company on mutually satisfactory terms. The first two of these are said to be in bonanza, as is also the Descubridora at Potrero.

DUTCH GUIANA.

The French government has sent orders to Cayenne to respect the *status quo*, pending the decision of the arbitrator (the Emperor of Russia) as to the rightful ownership of the disputed and highly auriferous strip of territory between French and Dutch Guiana. There have been loud complaints in the Dutch press, that the French had already commenced to treat the territory in question. Mr. Tromp, recently sent to Surinam by the Guiana Gold Mining Company in Amsterdam in order to inquire into this company's mining property, the Placer National, in French Guiana, has just returned, says *Industries*, with a not very favorable report. The alluvial gold found on the property is not so rich as the prospectus put forth, but very rich gold quartz has been discovered, to work which, suitable machinery will have to be sent out, and as the Placer National is only explored to a small extent, alluvial gold of good quality may yet be traced in the numerous creeks which remain to be "proved."

## MEETINGS.

Aspen Consolidated Mining Company, at Aspen, Colo., December 8, at 2 P. M.

Julien Gold Mining and Smelting Company of California, at East St. Louis, Ill., December 1st, at 12 o'clock noon.

New Central Coal Company, at Room 54, No. 1 Broadway, New York City, December 9th, at 12 o'clock noon.

Pilot Mining Company, at East St. Louis, Ill., December 1st, at 12 o'clock noon.

### DIVIDENDS.

Alabama Mineral Land Company, dividend of (5) five per cent., payable December 1st, at the Continental National Bank, New York City. Transfer books close November 25th, and reopen December 3d.

Daly Mining Company, dividend No. 45, of 25 cents per share, aggregating $37,500, payable November 29th at the office of Messrs. Lounsbery & Co., Mills Building, New York. Transfer books close November 25th and reopen December 30th.

Homestake Mining Company, dividend No. 140, of ten cents per share, aggregating $12,500, payable Novembr 25th, at the office of Messrs. Lounsbery & Co., Mills Building, New York City. Transfer books close November 20th, and reopen November 27th.

Ontario Silver Mining Company, dividend No. 174, of fifty cents per share, aggregating $75,000, payable November 29th, at the office of Messrs. Lounsbery & Co., Mills Building, New York City. Transfer books close November 25th, and reopen November 30th.

### ASSESSMENTS.

| Company. | No. | When levied. | D'l'nq't in office. | Day of Sale. | Amn't per share. |
|---|---|---|---|---|---|
| Alliance, Utah | 9 | Oct. 15 | Nov. 15 | Dec. 8 | .10 |
| Baker Divide, Cal. | 18 | Oct. 7 | Nov. 11 | Dec. 4 | .20 |
| Big Camas, Idaho | 5 | Oct. 15 | Nov. 17 | Dec. 17 | .05 |
| Con. Imperial, Nev. | 29 | Oct. 13 | Nov. 15 | Dec. 8 | .05 |
| Creston, S. Dak | 2 | Oct. 15 | Nov. 15 | Dec. 2 | .001 |
| Florence, S Dak | 5 | Sept. 24 | Nov. 15 | Nov. 30 | .004 |
| Goleta, Cal | 1 | Sept. 16 | Oct. 27 | Nov. 24 | .10 |
| Hale & Norcross | 96 | Oct. 7 | Nov. 12 | Dec. 3 | .50 |
| Martin White | 24 | Oct. 17 | Nov. 24 | Dec. 16 | .25 |
| Mexican, Nev | 41 | Oct. 18 | Nov. 20 | Dec. 10 | .25 |
| Mono, Cal | 30 | Sept. 18 | Oct. 28 | Dec. 2 | .25 |
| North Peer, Ariz. | 6 | Oct. 1 | Nov. 5 | Nov. 25 | .05 |
| Prior Hill, S. Dak | 1 | Oct. 27 | Nov. 29 | Dec. 15 | .004 |
| Russell, Cal | 7 | Oct. 13 | Nov. 17 | Dec. 8 | .05 |
| Seabury-Calkins, S. Dak | 13 | Oct. 27 | Nov. 29 | Dec. 20 | .01 |
| Seg. Belcher | 7 | Oct. 7 | Nov. 10 | Dec. 1 | .25 |
| Silver Hill | 27 | Oct. 8 | Nov. 13 | Dec. 3 | .20 |
| Sterling, Cal | 1 | Sept. 16 | Oct. 27 | Nov. 24 | .06 |
| Washoe, Nev | 1 | Oct. 28 | Nov. 28 | Dec. 27 | .05 |

### FINANCIAL STATEMENTS.

The financial balances of the following mining companies on November 1st were as follows:

CASH ON HAND.

| | | | |
|---|---|---|---|
| Alpha | $24,660 | Kentuck | $4,614 |
| Alta | 38,227 | Lady Washington | 10,922 |
| Andes | 14,706 | Locomotive | 1,405 |
| Belcher | 29,735 | Mexican | 1,341 |
| Best & Belcher | 19,394 | Mount Diablo | 6,200 |
| Bodie | 12,504 | Mono | 13,892 |
| Bullion | 6,884 | N. Commonwealth | 1,048 |
| Bulwer | 5,410 | Occidental | *8,005 |
| Caledonia | 5,093 | Ophir | 23,920 |
| Challenge | 2,442 | Overman | 58,794 |
| Commonwealth | †3,200 | Peer | 6,566 |
| Con. Cal. & Va | ‡ | Peerless | 10,211 |
| Con. New York | 2,889 | Sierre Nevada | 18,603 |
| Crocker | 6,870 | Silver Hill | 2,977 |
| Exchequer | 13,265 | Utah Con | 9,932 |
| Gould & Curry | 25,834 | Weldon | 7,226 |

INDEBTEDNESS.

| | | | |
|---|---|---|---|
| Belle Isle | $16,294 | Holmes | §$31,005 |
| Chollar | 12,784 | Navajo | 18,875 |
| Confidence | | Nevada Queen | 19,500 |
| Consol. Imperial | 35,585 | N. Belle Isle | ††28,581 |
| Crown Point | ‖8,826 | Potosi | 26,301 |
| Del Monte | 12,370 | Savage | 4,211 |
| Grand Prize | 11,434 | Seg Belcher | 11,493 |
| Hale & Norcross | ‡‡69,908 | Standard Consol. | 3,889 |

* With unsold bullion valued at $5,954.

† With unsold bullion valued at $40,000, also $9,100 due on account.

‡ No cash, but unsold bullion valued at $326,255, less overdraft of $134,659.

§ With 13,506 ounces of unsold bullion on hand.

** With $54,137 due on assessment.

‖ With $8,534 in unsold bullion.

‡‡ With a large amount of unsold bullion and bills receivable on hand.

## MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 615 and 616.

NEW YORK, Friday Evening, Nov. 21.

We must once more report an uneventful week in mining stocks. The money market has not yet recovered from its depression, and it can scarcely be expected that the result of the recent financial difficulty will be beneficial to the mining market. A great many who were squeezed in the late flurry were forced to realize on whatever securities they possessed at the best they could obtain. The "bears" were on top, hence the lack of anything resembling activity in mining stocks. It is a rather encouraging fact that, despite the unsettled feeling in Wall street, the prices of mining stocks have not fallen off in anything like proportion to the decline in other securities. It means either that holders of mining shares have faith in their investments or that their investments are of too little importance to be taken into consideration.

Trading in the copper stocks has been resumed. We note a sale of 100 shares of Huron at $1.88. Another of Atlantic at $16.25. Calumet & Hecla has a solitary transaction at $259.75. Franklin was dealt in at $16.50 and Osceola at $33.13. Quincy was traded in to the extend of 50 shares at $90.38. Boston & Montana shows one sale at $43.25.

Alice had not been traded in for some time past and shows one sale at $2.15. Moulton was traded in to the extent of 200 shares at 35c.

California stocks show the only features of this market, the event of the week being the news of a strike in Brunswick. Mr. A. R. Lounsbery, Treasurer of the Brunswick Consolidated Gold Mining Company, in a circular to the stockholders, stated that the following telegram, dated November 19th, had just been received from Superintendent Fitzgerald: "We have struck a two foot vein of rich ore. The mine is improving." This stimulated trading in the stock as did also the report that people at the mine and in the vicinity had been sending orders to buy the stock here. During the week the price advanced from 7c. to 12c., and 15,600 shares were sold, of which the majority changed hands towards the close.

The other California stock that appeared in some demand was Plymouth, concerning the strike in which we publish some exclusive information in our mining news column. The price of this stock was stationary at $1.50.

Bodie Consolidated declined from $1.30 to 75c. Mono shows a decline from 65 to 50c.

Standard has one sale at $1.15.

Astoria as usual was traded in at 67c.

Quicksilver preferred was dealt in to the extent of 230 shares at $37.

Of the Black Hills stocks Caledonia was stationary at 75c. Homestake declined from $9 to $8.50, which is as low as it has been for quite a long time.

Of the Utah stocks Horn Silver declined from $3.25 to $3, and advanced to $3.15. We publish some information concerning this company in our mining news column. Ontario was traded in to the extent of 640 shares at from $40 to $42.50. This is the largest trading in Ontario which has occurred for quite a long time, and was no doubt due to the desire to realize on account of the squeeze in the money market, and not from any change in the mine.

Of the Colorado stocks Leadville Consolidated, at from 15 to 16c., shows sales of 2,800 shares and, at 35@40c., 1,600 shares of Little Chief changed hands.

Of the Comstocks Alta was in some demand at $1.05@$1.10. Andes shows one sale at $2. Best & Belcher another at $2.50. Chollar was in fair request $2.50@$2.70. Of Comstock Tunnel $100 of the scrip sold at 29. Julia was traded in to the extent of 1,700 shares at 37c.@40c. Mexican was quiet at $2.50@2.65. Occidental declined from $1.25 to 95c. Potosi has one sale at $7. Union Consolidated was in some demand at $2@$2.45. Utah was steady at 70c.@80c.

Consolidated California & Virginia was dealt in to the extent of 900 shares at $3.30@$3.80, the latter being the opening price. Crown Point has one sale at $1.80. Gould & Curry was stationary at $1.80. Savage was rather quiet at $2.20@$2.45. Sierra Nevada appeared in some demand at $2@$2.15. Yellow Jacket was quiet at $2@$2.25.

Stockholders in Comstocks will do well to communicate with the Mining Stock Association in San Francisco, which has now, we believe, a fair prospect of recovering from the mill ring some of the money of which the mine stockholders have been defrauded.

The stockholders of the Silver King, Ariz., mine are also invited to act with the same party in San Francisco, who believe they can promote their interests by a change in the management of the company at the next election.

Trading in the Tuscaroras has been resumed. We note sales of 300 shares of Belle Isle at 70c. to 87c. There is one transaction of Navajo at $1.20, and another of North Belle Isle at $1.25.

The recent selling at low prices in Phœnix of Arizona was done almost entirely by people who were forced to sell in order to protect other interests. The offerings were bought in by persons who are identified with the company. The stock opened at 68c., but rallied, and at the close was sold at 75c.; 9,600 shares changed hands.

The total transactions in mining stocks this week aggregated 53,700 shares.

### Boston. Nov. 20.

(From our Special Correspondent.)

There has been a fair amount of activity the past week in copper stocks, but at the expense of values. Holders who have been carrying stocks on margins have been compelled to liquidate in consequence of the impossibility of obtaining money on this class of securities, even at high rates, and, as a result of such combination of circumstances, prices have yielded, and the only wonder is that they have held up so well. There is no material change in the market for ingot, and the visible supply seems to be rather diminishing than otherwise, and we are confident that, with the return of easy money, prices will recover very quickly, although we do not expect much of a bull market until after the New Year.

Allouez declined from $5¼ to $4⅛, which seems to be a price buyers are willing to pay for it, and so soon as the market improves this will be one of the first to feel it. To-day it sold up to $4⅝, and at the close $5⅛ was bid and none offered under $6.

Atlantic dropped from $17½ to $15¾, recovering to $17.

Boston & Montana has been the most active stock on the list, opening the week at $47½; a pressure to sell yesterday carried it down to $38½, the lowest point for the year. It recovered to-day, selling at $42½.

Butte & Boston on moderate dealings declined to $11, recovering to $14¼ to-day.

Calumet & Hecla touched $258, the lowest price since last April, a decline of $20 for the week. It rallied to-day to $265.

Centennial sold down to $14, and Kearsarge to $11½, both closing to-day at an advance of $1 for the former and $1½ for the latter. Late reports from both mines are of an encouraging nature and both will prove good purchases at present figures.

Franklin declined from $17⅝ to $16, and closed firm at the lower figure.

Osceola seemed a weak spot in the market, and was pressed for sale, resulting in a drop from $36½ to $30. It was better to-day, and sold up to $32¼.

Quincy declined ten points, from $95 to $85, and was steady at the decline.

Tamarack opened at $161, declined to $150, and recovered to $160.

Santa Fe sold from 50c. to 37½c., recovering to 40c.

Bonanza sold at 50c.; National at $1½.; Huron at $3½.; Native at 16c., and Tecumseh at $1¾@$1½.

Silver Stocks were heavy and very dull. Dunkin sold at 65c. Crescent at 10c.

3 P. M.—The market closed quite strong. Calumet & Hecla, $265 bid; Allouez, $5½ bid; Quincy, $85 bid; and Tamarack, $150@$160.

*By Telegraph.*—Calumet & Hecla, $268 bid; Tamarack, $160; Quincy, $90; Boston & Montana, $43; Osceola, $32⅜; Franklin, $17; Atlantic, $16 bid; Centennial, $14½ asked; Butte & Boston, $14¼; Kearsarge, $13 asked; Allouez, $5 bid; Huron, $2½.

### Kansas City. Nov. 17.

| Company. | Opening. | H. | L. | Closing. | Sales. |
|---|---|---|---|---|---|
| Argonaut | 22† | 22 | 22 | 22† | 200 |
| Bates-Hunter | 43½ | 43½* | 43½ | 44½† | 6,200 |
| Big Six | 8* | 8* | 7½ | 8† | 6,900 |
| Cash Gold | 13 | 13 | 12½ | 12† | 3,200 |
| Clay County | 98† | .... | .... | 98† | .... |
| Diamond B | 2½ | 2¾ | 2½ | 2½† | 1,100 |
| Hard Money | 4¾ | 6* | 4¾ | 5½† | 4,100 |
| Hunki Dori | .... | .... | .... | .... | .... |
| Iron Clad | 7 | 7 | 7 | 7† | 500 |
| Kansas City M. & M. Co | 2.70 | 2.70 | 2.70 | 2.70† | 310 |
| Kansas City, Col | 18‖ | 18‖ | 17 | 17† | 700 |
| Leavenworth | 66½ | 70* | 66½ | 67† | 8,000 |
| Little Nugget | 91½ | 95 | 91½ | 95† | 300 |
| Little Rule | 88 | 88 | 88 | 90† | 100 |
| May Mazeppa | 1.02 | 1.02 | 1 02 | 1.02† | 100 |
| Minnequa Zinc M. Co | 5½ | 5½ | 5½ | 5† | 500 |
| Monte Cristo | 2¼ | .... | .... | 2¼† | ..... |
| Morning Glim | 40 | 40 | 40 | 41† | 400 |
| Pay Rock | 5† | .... | .... | 5† | ..... |
| Pelican | 20‡ | .... | .... | .... | ..... |
| Potosi | 8 | 8½ | 8 | 8† | 600 |
| Running Lode | 22½† | .... | .... | 24† | ..... |
| Sylph | 20‖ | 20‖ | 17 | 17† | 300 |
| Total | | | | | 33,510 |
| Pit sales | | | | | ..... |

†Bid. ‡Asked. * Buyer 30. §Seller 30. §* Seller 60. ‖Buyer 60.

### Lake Superior Iron and Gold Stocks.

IRON MINING STOCKS.

| Name of company. | Par value. | Bid. | Asked. |
|---|---|---|---|
| Ashland Iron Co | $25.00 | $60.00 | $66.00 |
| Aurora Iron Co | 25 00 | 8.50 | 9.50 |
| Champion Iron Co | 25 00 | 100.00 | 102.00 |
| Chandler Iron Co | 25.00 | 40.00 | 42.00 |
| Chicago & Minn. Ore Co | 100.00 | 115.00 | 118.00 |
| Cleveland Iron Co | 25.00 | 17.00 | 18.00 |
| Germania | 25.00 | 11.50 | 12.00 |
| Jackson Iron Co | 25.00 | 110.00 | 125.00 |
| Lake Superior Iron Co | 25.00 | 70.00 | 75.00 |
| Milwaukee Iron Co | 25.00 | 5.50 | 6.50 |
| Minnesota Iron Co | 100.00 | 83.00 | 87.00 |
| Montreal Iron Co | 25.00 | 9.50 | 10.00 |
| Norrie (Metropolitan) | 25.00 | 75.00 | 78.00 |
| Odanah Iron Co | 25.00 | 17.00 | 18.00 |
| Pittsburg Lake Angeline Co | 25.00 | 175.00 | 200.00 |
| Republic Iron Co | 25.00 | 39.50 | 41.00 |

GOLD MINING STOCKS.

| Name of Company. | Par value. | Lowest. | High. |
|---|---|---|---|
| Gold Lake Mg. Co | * | .... | .... |
| Grayling Gold & Silver Co | $25.00* | .... | .... |
| Michigan Gold Co | 25.00* | .... | .... |
| Peninsula Gold & Silver Co | 25.00* | .... | .... |
| Ropes Gold & Silver Co | 25.00 | 2.00 | $2.25 |

*Quotations nominal.

### Denver.

(From our Special Correspondent.) Nov. 17.

The market for past week has not been as active as desired, nor orders as plentiful. The dividend payers attract the most attention, and have the call in small speculative as well as permanent orders. A flurry was created in the Big Six in the last three days, and a large number of shares were disposed of; the reason is not given, but supposed to be a rich strike. Many of the listed properties will be worked all winter, and it is to be hoped that some of the property will show more to the front soon, by a use of more muscle and development, for it is fully time they, or some of them, did

so. The Exchange Building is pushed as rapidly as possible. Ores are still coming in freely.

Prices and sales for the week ending Nov. 15th.

| Company. | Opening. | H. | L. | Closing. | S. |
|---|---|---|---|---|---|
| Alleghany,Colo | 14b | *15 | 14 | 13¾ | 800 |
| Amity, Colo | 06¼b | 06½ | 05 | 05 | 3,200 |
| Bangkok, C. B., Colo | 07¾ | *09 | 07¾ | 08 | 41,500 |
| Bates-Hunter, Colo | 45b | 46 | 45 | 46 | 2,200 |
| Brownlow, Colo | 06b | 06¼b | 06 | 06 | 400 |
| Calliope, Colo | 21b | 24¾ | ‡20 | 21½ | 3,600 |
| Cash, Colo | *15b | *15b | 13 | 10 | 100 |
| Clay County, Colo | 99b | *103 | 98 | 98 | 1,600 |
| Hard Money, Colo | 04½b | 07½ | 03 | 07½ | 11,600 |
| Leavenworth | 65b | 67 | 67 | 67 | 400 |
| Little Rule, Colo | 89b | 90 | 89 | 90 | 6,000 |
| Matchless, Colo | 50b | 200b | 100b | 200 | ..... |
| May-Mazeppa, Colo | 103b | *108 | *103 | 104 | 1,500 |
| Mollie Gibson, Colo | 25b | 25b | 25b | 25 | ..... |
| Oro, Colo | 52b | 50b | 50b | 50 | ..... |
| Pay Rock, Colo | 05b | ‡06 | 05 | 04¾ | 1,700 |
| Puzzler, Colo | 08½ | *09 | 08¼ | 07¼ | 4,900 |
| Reed-National, Colo | 69b | 69b | 69b | 69 | ..... |
| Running Lode | 21b | 23 | 22½ | 21 | 500 |
| Silver Cord, Colo | 35b | 35b | 35b | 35 | ..... |
| Whale, Colo | 16½b | 17 | 16¼ | 19 | 500 |
| Prospects: | | | | | |
| Argonaut, Colo | 20b | 20¼b | 20 | 15 | 200 |
| Aspen United, Colo | 06¾b | *07 | 06 | 06 | 4,700 |
| Big Indian, Colo | 10b | 11¾ | 10¾ | 11 | 800 |
| Big Six, Colo | 07b | *07¼ | 06 | 06¾ | 39,700 |
| Century, Colo | 33¼b | 34 | 34 | 33½ | 2,000 |
| Claudia J. Colo | 06½b | 07½ | 06¾ | 06¼ | 2,900 |
| Nat. G. & Oil Co | 22 | *26 | 20½ | 19½ | 2,700 |
| Diamond B., Colo | 03 | 03¼ | 02¾ | 02¾ | 8,200 |
| Emmons, Colo | *37½ | ‡40 | 35 | 35½ | 10,300 |
| Golden Treasure, Colo | 20b | 21½ | 20¼ | 20 | 2,000 |
| Ironclad, Colo | 06¼b | 06¾b | 05½b | 06 | ..... |
| John Jay, Colo | 20a | 13 | 12 | 11 | 6,400 |
| Justice | 15b | 1o¼ | 15¼ | 15¼ | 300 |
| Legal Tender, Colo | 04½b | *05 | 04 | 04 | 2,700 |
| Morning Glim, Colo | 44b | 47 | 45 | 46 | 1,500 |
| Park Consolidated | 34b | *35½ | *35½ | 34¼ | 5,000 |
| Potosi, Colo | 07¼b | 07 | 06½ | 06¾ | 3,400 |
| Rialto, Colo | 59b | 59b | 58 | 58 | 100 |
| Total for the week | | | | | 173,200 |

*Buyer 30 days. †Buyer 60 days. ‡Seller 60 days. §Seller 30 days. a Asked. b Bid.

### St. Louis.

Nov. 19.

(From our Special Correspondent.)

Business on the Exchange this week was very good. Prices, however, fell off considerably in most cases and only two stocks held their own.

Central Silver had more than its usual demand, but the market was very unsteady and managed to drop from 23¾c. to 20c., although reports from the mine were encouraging. During the week 40,200 shares changed hands.

American & Nettie fell 16c. this week and is now quoted at 55c.; 1,600 shares sold, of which 800 brought 60@63¾c. on Tuesday.

Yuma has had but one sale this week of 400 shares at 56¼@60c. The market closes at 51c.

West Granite has been taken off call by the Mining Exchange Board of Directors and Elizabeth placed in its stead.

A gold retort, amounting to 37·63 ounces of gold, has been received from the Little Albert.

Granite Mountain was an exception to the general decline in stocks this week, and advanced from $43 to $45. Ten shares brought the latter price; to-day, however, finds it at $43. The mine's semi-weekly shipment amounted to 21 bars, containing 77 ounces of gold and 29,000 ounces of silver.

Breen followed the bad example of the principal stocks and steadily declined until $1.17½ was reached. Sales for the week aggregated 3,900 shares, 1,800 of which brought only $1.40.

Elizabeth, the newly-listed stock, was in fair demand and managed to escape the decline which the other stocks suffered. At the beginning of the week 1,200 shares sold at $2.20@$2.22½, and the market closed to-day at $2.25. During the week the stock went as high as $2.35. Sales for the week footed up 10,800.

Montrose declined but 1¼c. this week and had a brisk demand, showing 2,100 shares sold for the week's business.

La Union opened at ·07c. and closes at ·03½c. The market was active and 7,400 shares were sold.

Adams fell 15c., and is now quoted at $1.70

Gold King did not pan out as well this week as last. It has fallen to ·09c. and had but one sale of 100 shares.

Major Budd was more in demand than it has been for some time. Opening at ·07c., it closes to-day with 2,100 shares sold at prices ranging from ·06 to 07c. The market at present is ·05c.

Among the sales for the week were Silver Age, 1,100; Cleveland, 100; Ingram, 100; and Adams, 700.

## PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

The petroleum market this week has been lower and dull. Operations in the stock market have absorbed attention, and transactions in petroleum have been so small as to be unworthy of talk or consideration. A few thousand barrels of oil have come upon the market and broken the price, but the situation remains unchanged. We think the tendency of oil is toward lower prices.

NEW YORK STOCK EXCHANGE.

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---|---|---|---|---|---|
| Nov. 15 | .... | .... | .... | .... | ..... |
| 17 | 71 | 71 | 71 | 71 | 5,000 |
| 18 | 70¼ | 70¼ | 70 | 70¼ | 15,000 |
| 19 | 69 | 68¾ | 67 | 68¾ | 40,000 |
| 20 | .... | .... | .... | .... | ..... |
| 21 | 68¼ | 68¾ | 68¼ | 68¼ | 12,000 |
| Total sales in barrels | | | | | 72,000 |

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

| | Opening. | Highest. | Lowest. | Closing. | Sales. |
|---|---|---|---|---|---|
| Nov. 15 | 72 | 72¼ | 71½ | 71¼ | 6,000 |
| 17 | 71½ | 71½ | 69 | 70¼ | 39,000 |
| 18 | 71 | 71 | 69½ | 69¾ | 64,000 |
| 19 | 67½ | 67¼ | 67 | 69¼ | 31,000 |
| 20 | 69½ | 69½ | 68¾ | 68¾ | 42,000 |
| 21 | 69 | 69⅝ | 68¾ | 69⅛ | 38,000 |
| Total sales in barrels | | | | | 220,000 |

## COAL TRADE REVIEW.

NEW YORK, Friday Evening, November 21.

### Statistics.

STATEMENT of shipments of anthracite coal (approximated) for the week ending November 25th, 1890, compared with same period last year:

| Regions. | Nov. 15, 1890. | Nov. 16, 1889. | Difference. |
|---|---|---|---|
| Wyoming Region, Tons | 458,098 | 446,078 | Inc. 12,020 |
| Lehigh Region " | 149,128 | 141,263 | " 7,865 |
| Schuylkill Region " | 281,322 | 249,510 | " 31,812 |
| Total..... Tons | 888,518 | 836,851 | Inc. 51,697 |
| Total for year to date Tons | 30,919,450 | 31,222,925 | Dec. 273,475 |

STATEMENT of anthracite coal shipments for month of October, 1890, compared with the same period last year. Compiled from the returns furnished by the mine operators:

| Regions. | October, 1890. | October, 1889. | Difference. |
|---|---|---|---|
| Wyoming Region | 2,013,941.15 | 1,748,370.05 | Inc. 265,571.10 |
| Lehigh Region | 657,558.01 | 663,725.14 | Dec. 6,167.13 |
| Schuylkill Region | 1,221,217.05 | 1,299,774.17 | " 78,557.12 |
| Total | 3,892,716.21 | 3,711,869.36 | Inc. 180,846.85 |

| Regions. | For year. 1890. | For Year 1889. | Difference. |
|---|---|---|---|
| Wyoming Region | 15,165,666.02 | 15,452,245.17 | Dec. 286,579.15 |
| Lehigh Region | 5,254,876.10 | 5,233,268.04 | Inc. 51,608.06 |
| Schuylkill Region | 8,837,937.00 | 8,613,647.09 | " 224,289.91 |
| Total | 29,288,479.12 | 29,299,160.30 | Dec. 10,681.18 |

The stock of coal on hand at tide-water shipping points, October 31st, 1890, was 632,498 tons; on September 30th, 1890, 676,318 tons. Decrease, 43,820 tons.

PRODUCTION OF BITUMINOUS COAL for week ending November 15th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

| | 1890. Week. | 1890. Year. | 1889. Year. |
|---|---|---|---|
| Phila. & Erie R.R | 3,074 | 117,665 | 74,836 |
| Cumberland, Md | *85,207 | 3,398,291 | 2,680,478 |
| Barclay, Pa | *3,207 | 135,684 | 105,903 |
| Broad Top, Pa | 11,124 | 442,385 | 306,278 |
| Clearfield, Pa | 74,446 | 3,264,262 | 475,958 |
| Allegheny, Pa | 21,610 | 1,104,590 | 716 863 |
| Beach Creek, Pa | 39,411 | 1,663,856 | 1,377,863 |
| Pocahontas Flat Top | 35,676 | 1,639,704 | 1,506,453 |
| Kanawha, W. Va | *39,950 | 1,780,297 | 1,611,511 |
| Total | 313,705 | 13,536,734 | 8,856,143 |

* Estimated.
†Week ending Nov. 7th.

WESTERN SHIPMENTS.

| | | | |
|---|---|---|---|
| Pittsburg, Pa | 22,527 | 728,937 | 584,540 |
| Westmoreland, Pa | 30,536 | 1,006,177 | 1,340,792 |
| Monongahela, Pa | 14,549 | 469,949 | 338,715 |
| Total | 67,612 | 2,205,063 | 2,464,047 |
| Grand Total | 381,317 | 15,741,797 | 11,320,190 |

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending November 15th, and year from January 1st, in tons of 2,000 lbs.: Week, 104,925 tons; year, 4,361,238 tons; to corresponding date in 1889, 3,880,161.

### Anthracite.

"Hope deferred" maketh the hard coal operators pronounce the market "sick." It is dull. What was said in this column last week, that the week was one of the dullest of the year, may now be accentuated by the assertion that the past week was absolutely the dullest. From week to week, as one seven-day period has put the preceding one behind it, have the anthracite coal operators been optimistically predicting cold weather. Cold weather hasn't come, and the output for the month of November, which looked fairly reasonable when it was decided upon, now seems enormous. If present weather indications are of any account, a green Thanksgiving and a green Christmas are among the possibilities.

It is admitted on all hands that the mild weather has killed business for the time being by keeping the consumer out of the market. Even a decided cold snap will only have the effect of reducing the plethoric conditions of the coal yards to normal proportions. The shortage of cars, which was a week or two ago a blessing, is now a matter of indifference. The only hope of the trade has been that the sales agents would limit the December output to 2,000,000 tons. One trade journal exhorts them to restrict the tonnage to those figures. The representatives of the various companies met to-day at the office of the Pennsylvania Coal Company, and, in the absence of a quorum, arrived at no official conclusions. A canvass among those present resulted in the conclusion that at the next meeting it will be decided to reduce the tonnage for December to 100,000 tons per day, or 2,600,000 tons. It is tolerably sure that the present price will be continued.

There is not much to choose in sizes as regards activity. Stove may be said to move a little quicker than the others, with pea and buckwheat inactive and weaker. The companies maintain prices pretty generally, but individual coal undercuts them from 20 to 40 cents a ton.

The November prices are: Stove, $4.40; egg, $4.10; broken, $3 75; chestnut, $3.95; buckwheat, Lehigh, $1.50; free-burning, $1.65@$1.75 on board; pea, $2.15; free-burning, $2.40@$2.65 on board.

### Bituminous.

It has been confidently asserted that the recent panicky disposition among the Wall street operators would have no perceptible effect on the soft coal trade. True, it may have had no direct effect, but it is now just as confidently asserted that indirectly the recent financial upheavals will have a decided effect, though it may be indirect. The president of one of the largest bituminous coal companies expressed himself to-day on this question in very decided terms. "The recent financial troubles," said he, "will in all probability prove of great benefit to us. Some twenty thousand men or so in the Clearfield region have been quiescent of late on the understanding that at the beginning of the new year the new ten per cent. higher scale would go into operation or there would be a big strike. It is generally conceded that the recent financial flurry has indefinitely postponed this determination. The men and their leaders realize that railroads are built in Wall street, and that it will be some time before money will be free enough to permit much new construction, and that the demand for soft coal will therefore be temporarily checked. "In this case the hands of the mine owners would be strengthened if the men struck work."

The trouble between the miners and the owners at the Standard Mine, Connellsville, has been settled by the reinstatement of the Hungarian "spotter" who was the *casus belli*, and the 4,000 men have returned to work. In fact, at this writing, the horizon is almost clear of actual labor trouble, and the mines are turning out coal much faster than the dealers at this end can obtain it. Shipments west are free enough, but cars and vessels east are so scarce that some jobbers are offering as much as 20 cents a ton higher than the quoted prices for other people's coal to enable them to keep contracts. Dispatches have been flying over the wires to Philadelphia and Baltimore to corner vessels, in the hope of thus securing coal there, and diverting it from its intended Eastern destination. Some kinds are as much oversold as they were three weeks ago, and the operators are suspected of putting in substitute coal when they can get it.

The Hawks Nest Mines, on the C. & P. R. R., in West Virginia, are now shipping about 650 tons a day of a coal that is giving the greatest satisfaction. The company will soon build coke ovens.

The demand for consumption is unabated, and that portion of the supply in this market which depends on the Pennsylvania and Baltimore & Ohio lines, and Baltimore and Philadelphia vessels, is certainly short. The consequence is a decided "bearish" tendency. No new orders of importance have been accepted during the week, and fancy prices must be bid for small supplies outside of contracts.

Prices are a shade stiffer, as follows: At Baltimore, $2.50 f.o.b.; at Philadelphia, $2.60; at New York, $3.25; alongside, $3.45.

### Boston.

Nov. 20.

(From our Special Correspondent.)

The anthracite market continues featureless. The demand, owing to the mildness of the weather, is very light, and may be summed up in a few orders which are placed at intervals by dealers who may chance to be in need of any particular size. The spot stock is fairly large and certainly more than ample to meet the meager consumptive demand. At tidewater there is a good supply which under the present conditions does not seem destined to dwindle away very rapidly. Prices are fairly well maintained. The principal agents are adhering pretty closely to the following prices f.o.b. at New York: Stove, $4.40; egg, $4.25; chestnut, $3.95 and $4 for broken. Shading, however, continues, and it is comparatively safe to estimate that the duty of the sales made do not command the full prices.

The bituminous market has not altered perceptibly in the past week. Offerings are very light, while the inquiry continues good.

Coal does not come forward any faster, and agents claim that they are unable to say just when it will be possible to get a satisfactory supply. Some are more fortunate in this respect than others, and consequently have a practical monopoly of the market for the moment. The inquiry on the spot is very good and the meager offerings command askings. Gas coal is in good demand at firm prices. If the present state of affairs continues much longer it would not be improbable to see

dealers turn to Cape Breton for a supply of gas coal.

Freights are holding steady, and although the weather has been extremely favorable for making trips, prices do not show any signs of being easier. From New York is quoted 75@85c., from Philadelphia $1@$1.10, and $1.10@$1.20 from Baltimore. Vessels are not offering freely.

The retail demand has weakened perceptibly. The weather is opposed to the consumption of coal. It resembles last winter in this respect, and some dealers are firm in the belief that we will not have either a cold or stormy winter in this section. Prices are holding steady. Retailers have moderate stocks on hand.

The receipts of coal at the port of Boston for the week ending November 15th were: 24,934 tons of anthracite and 3,105 tons of bituminous against 19,604 tons of anthracite and 11,399 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,548,352 tons of anthracite and 849,181 tons of bituminous against 1,526,179 tons of anthracite and 883,810 tons of bituminous for the same time last year.

**Buffalo.** Nov. 20.

(From our Special Correspondent.)

There are no particular specialties to report in the anthracite coal trade; business light at unchanged quotations.

Bituminous coal in good demand and prices nominally unchanged. The lack of transportation facilities is still a source of complaint and is the cause of small stocks of some varieties. The indications point to a firm market for some time at any rate, and dealers generally anticipate a season of prosperity this winter. Locally our manufacturing interests are in good shape, and new enterprises are being started with encouraging frequency. Coke quiet and unchanged.

The Erie, Oswego, and Champlain canals will be closed on November 30th. The superintendent is of the opinion that a very large appropriation will be required for the operation and maintenance of all the canals the coming year.

The Western Car Service Association, at a meeting held here last week, gave notice of extending its field of action in all directions. It seems as if a uniform system of demurrage charges would be in vogue everywhere before long.

By-the-bye, a newspaper telegram says that "a fuel famine is feared in Nebraska on accouut of lack of cars to transport coal from the Union Pacific mines in Wyoming to points in this State. Already a number of towns have reported that the coal supply has been exhausted and no more could be secured. In case of severe weather or a heavy fall of snow great suffering would ensue, as many of the towns in this State are entirely dependent on the Union Pacific coal for fuel."

Lake freights on coal are steady, with liberal shipments to Chicago, Milwaukee, and Duluth, shippers being anxious to make the most of the last few days of navigation. It is reported that "the Western dealers have found out that they must have more coal after all, and now that they can't get very much more, they want it awfully bad."

The shipments of coal by lake from this port from November 13th to 19th, both days inclusive, were 81,870 net tons distributed about as follows: 39,940 to Chicago, 25,000 to Milwaukee, 10,400 to Duluth, 2,800 to Superior, 1,630 to Detroit, 100 to Bay City, 650 to Windsor and 1,350 to Toledo. Total thus far this season to date 1,983,945 net tons. The rates of freight were: 75c. to Chicago, Milwaukee, Duluth and Superior; 40c. to Detroit, Toledo, Windsor and St. Clair; p. t. to Alpena; closing with some request for vessels for Chicago and Milwaukee. Weather mild and open.

The movements of coal by canal for the second week in November at this port were: Receipts, 2,168 and shipments 2,776 net tons. The canal coal charters reported were as follows: From Buffalo, five loads to Syracuse, 55c.; three loads to Rome, 80c.; three loads to New York, $1.25, and two loads to Oriskany, 75c., all per net ton free on and off.

**Chicago.** Nov. 19.

(From our Special Correspondent.)

The cold weather, so much desired and predicted by Chicago coal dealers, has not made its appearance. Trade is quite active and prices as a rule are held firm. The receipts of anthracite coal during October are reported the largest for any one month in the history of the market, yet the supply remains very deficient in quantity and many orders remain unfilled. Country dealers are now endeavoring to secure coal at market prices without reference to previous contracts.

Wholesale prices are f. o. b. Chicogo: Large egg, $5.50; small egg, range and chestnut, $5.75; Lehigh lump, $7.

The retail prices fixed by the Chicago Coal Exchange are: Large egg, $6.75; small egg, range and chestnut, $7.

A cold snap would alter the condition of the market to a great extent; many purchases were made late, and many are yet to be made pending the weather outlook. Trade under such conditions will undoubtedly be active during the entire season, and a fair business is expected without regard to weather surprises.

The bituminous market remains in excellent shape in as far as demand is concerned. The only drawback is the old complaint "scarcity of cars." This difficulty instead of diminishing is daily increasing. Lake trade is about over and more cars must be furnished very soon. This trade also promises to be an active one, during the entire winter. Quotations per ton of 2,000 pounds are: Erie, $4.25; Pittsburg, $3.40; Indiana block, $2.50 @$2.65; Blossburg, $4.15; Greene and Sullivan county (Ind.), shaft, $2.25@$2.40; Jackson Hill $3.45; Jackson shaft, $3.45; Hocking Valley, $3.30; Youghiogheny, $3.40. Wilmington, Mt. Olive and other Illinois coals at Chicago group points, $1.75 per ton.

The coke market is in a highly satisfactory condition. Receipts during last month were large, and those for the present month promise well. The demand continues steady and prices are very firm. There is, of course, still much complaint about insufficiency of transportation facilities. Quotations are: Connellsville, 72 hours, $5.20; domestic, crushed, $4.10@$4.25; Elk Lick, 72 hour, $4.25@$4.50 per ton of 2,000 pounds f.o.b. Chicago.

**Pittsburg.** Nov. 20.

(From our Special Correspondent.)

**Coal.**—The market rules very firm, with an active demand for local purposes. The resumption of the use of coal by many mills, elevators and private dwellings increases the demand very materially. The Ohio River is in good navigable order.

Shipments since last report aggregate 2,000,000 bushels; prices in Cincinnati and Louisville have advanced one-half cent per bushel.

The present rates are:

| Per 100 bushels. | | Per 100 bushels. | |
|---|---|---|---|
| 1st pool | $4.75 | 3d pool | $3.90 |
| 2d pool | 4.50 | 4th pool | 3.25 |

Railroad coal, $5.00@$5.50.

**Connellsville Coke.**—Market firm, with an active demand; as usual a want of cars retards shipments to a certain extent. Furnaces at various points are making the same old complaint of a lack of coke. All parties feel the effect of the car supply; the coke men have too much coke, the furnace men not enough. The individual cars are a very valuable assistance to the leading companies. There are nearly 16,000 ovens in the regions, nearly all of which are in operation. The week's shipments amounted to 6,880 against 6,800 for the previous week. Western shipments fell off 370 cars. Eastern and Pittsburg increased.

The rates were for 2,000 pounds f. o. b. cars at ovens: Blast furnace coke, $2.15; foundry coke, $2.45; crushed coke, $2.65.

**Freights** to Pittsburg 70c. per ton; Mahoning and Shenango Valleys, $1.35; St. Louis, $3.35; Cleveland, $1.70; Chicago, $2.75.

## METAL MARKET.

NEW YORK, Friday Evening, Nov. 17.

**Prices of silver per ounce troy.**

| Nov. | Sterling Exch'ge. | Lond'n Pence. | N. Y. Cts. | Nov. | Sterling Exch'ge. | Lond'n Pence. | N. Y. Cts. |
|---|---|---|---|---|---|---|---|
| 15 | 4.85 | 47⅜ | 1.02 | 19 | 4.85 | 45 | 96⅛ @97⅛ |
| 17 | 4.84 | 46 | 1.00 | 20 | 4.86 | 45¼ | 98¾ @99 |
| 18 | 4.84 | 45 | 99½ | 21 | 4.86 | 46⅛ | 1.00¾ 1.01¼ |

This week has been one of violent fluctuations in silver prices. The principal cause has been the tightness of money and the demoralization in financial circles, both here and in London. Although the government completed the purchase of 4,500,000 ounces for November on the 19th, silver has had a sharp reaction upward caused by the active bidding of London buyers, and closes strong.

We are advised by special telegram from Denver that "a meeting has been called by the Denver Mining Exchange and mine owners with the view of passing a resolution to stop the production of ores until after Congress meets and acts on a silver bill, and to stop Eastern speculation in silver."

The reference must be to some new silver bill to be introduced at the next session of Congress, but we fail to see how any practical result can come from the proposed "resolution" of the Stock Exchange. Of course if a sufficient number of the producers are willing to immolate themselves and stop production, it would help to advance the price of silver, but there is not the least probability of their doing this. Neither will any resolution which the Exchange may adopt have the least effect on the speculators.

The low price of silver at present, in spite of the large purchases of the government, is due to an excess in supply. There was more silver ready to go on the market than the advocates of the last silver bill believed, though we clearly pointed out this danger. Now we believe the offerings of silver will decrease, and we fully expect a stiffening in prices, but it is certainly not to be expected that it will go to $1.29 an ounce, as was expected when the silver bill was enacted.

There is no speculation in silver at present and all there was was "for a rise," and as far as it could tended to advance the price of the metal.

**Foreign Bank Statement.**

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate of discount, and it remains at 6 per cent. During the week the bank gained £3,420,395 bullion, and the proportion of its reserve to its liabilities was increased from 33·25 to 35·82 per cent., against a reduction from 41·41 to 40·94 per cent. in the same week last year, when its rate of discount was 5 per cent. The weekly statement of the Bank of France shows a loss of 80,851,000 frs. gold and a gain of 2,975,000 frs. silver.

**Silver Bullion Certificates.**

NEW YORK STOCK EXCHANGE.

| | Price. H. | Price. L. | Sales. |
|---|---|---|---|
| Nov. 15 | 102⅛ | 100¾ | 72,000 |
| Nov. 17 | 101 | 100 | 156,000 |
| Nov. 18 | 100 | 97⅛ | 134,000 |
| Nov. 19 | 98⅛ | 96¾ | 205,000 |
| Nov. 20 | 100 | 98¾ | 180,000 |
| Nov. 21 | 102 | 100¾ | 325,000 |
| Total sales | | | 1,072,000 |

The United States assay office at New York reports total receipts of silver for the week to be 108,000 ounces.

**Domestic and Foreign Coin.**

The following are the latest market quotations for American and other coin:

| | Bid. | Asked |
|---|---|---|
| Trade dollars | $ .75 | $ .80 |
| Mexican dollars | .78 | .80 |
| Peruvian soles and Chilian pesos | .73 | .75 |
| English silver | 4.80 | 4.84 |
| Five francs | .94 | .95 |
| Victoria sovereigns | 4.84 | 4.93 |
| Twenty francs | 3.86 | 3.90 |
| Twenty marks | 4.74 | 4.78 |
| Spanish doubloons | 15.55 | 15.70 |
| Spanish 25 pesetas | 4.80 | 4.85 |
| Mexican doubloons | 15.55 | 15.70 |
| Mexican 20 pesos | 19.50 | 19.60 |
| Ten guilders | 3.96 | 4.00 |
| Bar silver | 1.01¾ | 1.02⅛ |

**General Situation.**—Early this week a very uneasy feeling was prevalent in all business centers on account of the financial troubles of the prominent London banking firm, Baring Brothers, which were of such a serious nature that only the combined efforts of the Bank of England and most of the leading European banks prevented a catastrophe, the results of which could scarcely have been conceived. Money markets here were also seriously affected thereby, and the air was full of ill forebodings as to the consequences which might result and the failures to be apprehended in this city. The situation only cleared somewhat toward the end of the week, and in spite of a heavy failure announced late yesterday afternoon of a prominent Philadelphia house, a much easier feeling prevails all around, specially stimulated by better advices from London.

**Copper.**—Prices here are kept up, but are more or less nominal, especially in so far as lake copper is concerned. The quotation from first hands is still 17c., but a little second-hand copper is still offering at about 16½c. There has been some demand for cakes and wire bars, for which full prices were paid. In Arizona and casting copper the business has been more or less of a retail character, but prices have been fully sustained, as there was no pressure to sell from any quarters. We quote Arizona, 15½, and casting copper, according to brand and quantity, 14½@14¾.

The London market has been fluctuating rather widely owing to the influence exercised upon it by the general position. Prices for G. M. B., which closed last week at £66 10s., opened on Monday at £66 and rapidly declined on the same day to £55 7s. 6d., reaching the lowest point on Nov. 13th, when business was done at £53 15s.@£54 for spot cash. After this a rather stong reaction set in and the market steadily advanced to £55 12s. 6d. @£55 15s. for spot and £56 5s.@£56 7s. 6d. for three months.

The demand for refined and manufacturing copper was irregular, but a brisk business has been going on at the lower prices. Deliveries continue at rather a fair rate and the statistics again decreased in Europe during the first half of this month 1,600 tons, which clearly indicates that the article at large is in quite a healthy condition.

The exports of copper during the past week were as follows:

| | | | |
|---|---|---|---|
| To Antwerp— | Copper. | Lbs. | |
| S. S. Pennland | 2 casks | 2,400 | $360 |
| To Liverpool— | Copper matte. | Lbs. | |
| S. S. The Queen | 3,917 bags | 321 505 | 30,000 |
| To Liverpool— | Copper. | Lbs. | |
| S. S. Greece | 1 cask | 1,200 | 150 |
| S. S. The Queen | 2 pks. | 1,000 | 125 |

**Tin.**—The tendency during the first half of the week was flat and downward, and during the second half very firm and upward. On the declining market only very small transactions took place, everybody being disheartened and unwilling to buy, but as soon as more encouraging reports from London were received buyers became rather eager, and a very sharp advance was recorded over the last—namely, 20·15 on Wednesday to 20·70 on Thursday, and we are closing to-day: Spot, 21; November, 21; December, 20·90; January, 20·90, and February, 20·85.

Stocks are again in this city very small, and up to the end of the year only light supplies are expected, which will certainly leave us at the close of the year with smaller stocks than usual.

The London market was very uneasy. Spot tin opened on Monday at £94, falling the same day to £92, and again declining on Tuesday to £90 10s.,

reaching the lowest on Wednesday, when sales took place from £89 7s. 6d.@£89 10s. After this the advance was very rapid, and on November 20th the market opened rather excited at £91; later on £91 15s. was paid, and to-day spot touched £93 5s., and closed very firm at £92 10s.@£92 15s. for spot and £63 5s.@£93 10s. for three months.

**Lead** has experienced a very sharp decline. For some days past persistent efforts have been made to hammer prices down, which were eminently successful during the general depression in all the markets, everybody, regardless of the prevailing prices, being quite indifferent to making a purchase. Carload lots were sold from $4.85 to $4.90, but later on sales took place in larger quantities at $4.80@$4.75; but even at these figures consumers did not show much disposition to take in fresh supplies.

Prices in the West declined even more rapidly, and we are advised that in St. Louis lead could be freely obtained at 4·50c. These prices make the consumers again entirely dependent on home production, as no foreign lead can be imported to this country below 4.95-5c.; but such a heavy drop will likely be followed by a steadier market. At the close a decidedly firmer feeling prevails, and we quote to-day for spot and December delivery 4·85@4·90c.

*Chicago Lead Market.*—Messrs. Everett & Post telegraph us as follows: "The financial troubles have greatly affected pig lead, and there has been a sharp decline in values. The closing is weak and irregular; the nominal asking price is 4·75c."

*St. Louis Lead Market.*—John Wahl & Co. telegraph us as follows: "Demoralizing seaboard advices have had a very perplexing effect upon our market. Since our last report the metal has declined from 4·80@4·50c., at which latter figure there appears to be more sellers than buyers. Buyers have lost confidence and are under the impression they will see still lower values, and for this reason they take their supplies only as current requirements compel them."

**Spelter** has sold exceedingly firm, and this market is almost bare of supplies. We have to quote 6·10@6·20c. New York for November and December delivery, and we hear that large transactions have taken place for delivery over all of next year. From smelters hardly anything is to be had for December shipment and the metal is very scarce everywhere.

**Antimony** has been quiet, and we quote to-day: Cookson's, 20@20¼c.; L. X., 18@18¼c.; Hallett's, 17½@17¾c.

**Quicksilver.**—The market for this metal is very quiet, due to the stocking up of consumers before the McKinley bill went into effect. Quotations are: London £10, and New York $56@$57.

**Aluminum.**—We understand that pure aluminum guaranteed at least 98% fine is quoted in London at 5s., or $1.25 per pound. As the duty is 15 cents a pound this would bring the price here $1.40 per pound—a figure which presages a decline in quotations here.

## IRON MARKET REVIEW.

NEW YORK, Friday evening, Nov. 21.

So far as we can see the developments of the past week cannot be said to be of a favorable nature to those persons who expected to see higher prices prevail in the iron market. It is not an easy matter succinctly to state the situation. In regard to consumption and prices it is as it has been for some weeks, and the stringency in the money market is scarcely calculated to result in a general improvement. It is evidently true that prices are almost as low as can be expected. A further decline of 50 cents or $1 per ton would, in all probability, cause many furnaces to go out of blast, and, again, there is no reason why higher values should prevail when we take into consideration that the present consumption—in so far at least as concerns the New York market—is of a hand-to-mouth character. Large orders are the exception rather than the rule, but the aggregate business is large. Yet, to use the expression of a prominent iron dealer, this same volume of business, very great though it undoubtedly is, causes scarcely a ripple in the trade. Manufacturers make no great effort to press sales, which would produce lower prices.

In view of the prosperous business of a large number of furnaces it is scarcely probable that such an action will be taken, at least not in the immediate future. In regard to the present condition of the iron market, we can state positively that, being in a healthy, normal condition, only an extraordinary series of events—such as a general financial crisis—can alter radically the market as it now is.

**American Pig Iron.**—While this market is firm, a great dullness seems to hang over it. Business is almost altogether confined to small lots, although we hear of some orders of moderate size. Some deluded persons who have held warrants in expectation of an immense rise in values are endeavoring to realize on them. A report was afloat that some Southern companies were willing to make concessions in prices in order to obtain more orders, but this could not be authoritatively confirmed. It is said that a well-known firm, which is the agent of a prominent Southern coal and iron company, has resigned its agency. The firm in question is the same that sold a lot of 1,000 tons of No. 1 Southern iron at $16 a few weeks ago, the report of which was first published in this paper.

No information as to the truth about the resignation was given by the party concerned, but it is a fact that the question has been under consideration for some weeks past.

Our quotations this week are: Northern iron, No. 1 X, $17.50@$18; No. 2 X, $16.50@$17. Southern, No. 1 X, $16.50@$17.50, and No. 2 X, $15.50@$16.50.

**Scotch Pig Iron.**—Advices from "the other side," received as we go to press, state that the labor difficulties in the Scotch iron trade remain precisely as reported last week, still unsettled, and with little prospect of a near settlement. The recent financial trouble gave a black eye to speculation in warrants, of which the price has declined several shillings during the past fortnight. In the New York market we hear of only one sale, about 20 tons of Coltness at $26. The use of Scotch pig iron is limited. In days of yore, ere our iron industry had reached its present stage of high development, men who desired a very fluid iron were wont to employ considerable quantities of Scotch and English irons. At present the use of Scotch pig is confined to those who make very thin castings, hence the small consumption; and even this is daily decreasing as consumers find that American brands are satisfactory. Quotations in Scotch pig cannot be given, as makers refuse to make any.

**Spiegeleisen and Ferromanganese.**—We hear of absolutely no business in either of these. Consumers are well supplied, hence the dearth of new sales. Quotations are, for 20 per cent. spiegeleisen, $30@$30.50, and for 80 per cent. ferromanganese, $68@$69, for nearby delivery.

**Steel Rails.**—Nothing encouraging can be said of steel rails. We hear of no sales at all, and even inquiries are not made; altogether the market is as dull as it can be. Money is pretty tight, and railroads generally are doing but little in the way of road building. There seems to be but little disposition on their part to do much buying just now, although prices are certainly as low as any one can reasonably expect. Some mills complain that they find it difficult to collect for rails already delivered. It could not be ascertained just how much business railmen have for 1891, but at present, in the absence of orders, a good many mills are rolling billets. Quotations for rails are, nominally, $29 at the mill.

**Rail Fastenings.**—Nothing is doing in fastenings, the natural result of the depression in the rail market. In consequence of the absence of sales it is difficult to give quotations which shall be a fair criterion of the condition of the market. Spikes hold their own at 2·15c.; angle plates are 1·80@1·90c.; bolts and square nuts, 2·75c; hexagonal nuts, 2·95@3c.; complete joint, iron and steel, according to weight.

**Tubes and Pipes.**—Manufacturers report only a fair business in tubes and pipe. This statement by no means implies idleness, for the mills are generally busy on old orders, and pipe men really have nothing of which to complain. The Association has not met this month as yet, but it is scarcely to be supposed that prices will be changed. The following is the schedule of ruling discounts on car lots: 47½ per cent. on butt, black; 40 on galvanized; 60 on lap, black, and 47½ on lap, galvanized; boiler tubes, 45 on 1¾-inch. and smaller; 50 for 2 inches and larger. Casing, all sizes, 50 per cent.

**Structural Iron and Steel.**—Activity reigns in this market, and everthing connected with it is in good condition. Business this year has been very good, and makers are doing their best to bring about a similar prosperity in 1891. Our quotations this week are: Universal plates, 2·30c.; bridge plates, 2·40c.; angles, 2·20@2·30c., tees, 2·65c.; beams, 3·10c.

**Merchant Steel.**—The majority of manufacturers report an increased volume of business. One firm says that it has sold more tool steel during the past week than during any previous week this year. Quotations, however, remain undisturbed and are a repetition of last week's, to-wit: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2·60c.; open-hearth spring, 2·60c.; tire steel, 2·60c.; toe calks, 2·60c.; flat file, 4¾c.; mill file, 5¼c.; taper file, 7¼c.; first quality sheet, 10c.; second quality sheet, 8c.

**Old Rails.**—No sales have occurred during the week, and we can do little more than to report nominal quotations, as follows: Old iron tees, $25@$25.50; doubles, $26@$26.50.

### Chicago.

Nov. 19.

(From our Special Correspondent.)

The disturbed condition of money centers has as yet caused any cessation in Chicago's consumption of iron and steel. It keeps up at the high rate already reported. Buyers are continuously in the market for all classes of iron. Prices remain steady and firm. Bargains are not to be had in any line. It is probable that there is a sufficient number of new enterprises and new business in sight to keep up the present great consumption for some time to come. Particularly is this so as long as the present favorable weather continues for outside operations. Furnaces are well sold ahead and are not seeking new business at less than current rates. Finished iron generally continues in good demand, and all the mills are busy.

**Pig Iron.**—The present market is active and the demand is steady for small lots of all kinds of iron; heavy orders will probably follow later. Stocks are rapidly decreasing. Business is good in cokes, both Northern and Southern, with a fair demand for softeners and silveries. Lake Superior charcoals are in fair request, and all furnaces of this class are well sold ahead, notwithstanding the recent slight demoralization, which was entirely unwarranted. Heavy consumption continues and much business is being turned away by jobbing foundries. The outlook is good for a heavy business during the winter. The present deficient condition of car service in the coal and coke trades has had its influence at furnaces and foundries. Although no serions breaks on this account have been reported, coke irons will probably remain firm in prices until the close of the year. Car wheel irons will probably advance somewhat.

We quote to-day for cash per ton of 2,24, pounds, f. o. b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, $19.50@$20; Lake Superior coke, Bessemer, $18.50; Lake Superior coke, Bay View No. 1, $17@$17.50; No. 2, $16@$17; No. 3, $15.50@$16; Southern coke No. 1, $16@$17; No. 2, $15.50@$16.50; No. 3, $15@$16; Southern charcoal, $19@$19.50; standard Southern car wheel, $22@$24.50; Ohio softeners, Hanging Rock, $18@$18.50; Jackson County, $18.25@$18.75; Hanging Rock, cold blast, $26@$28; warm blast, $23@$25; No. 1 Scotch, according to brands, $26@$27; American Scotch, $19@$20; Bay View Scotch No. 1, $17; No. 2, $16; Chicago Scotch No. 1, $17; No. 2, $16; Emma Scotch, $19@$19.50; black band, Hubbard Scotch, $18.75; Haselton, $18.75; soft silvery, $18; Wellston No. 1, $18.75; No. 2, $18.25; Hamilton No. 1, $19.25@$19.75; Norton No. 1, $17.50@$18; Zanesville No. 1, $18.75@$19.25.

**Structural Iron.**—The demand holds up well owing to the continuance of fine weather, which builders are fully utilizing. Deliveries are being expected and business in this direction continues later than last year. Prices are firm. For car lots, f.o.b. Chicago, iron and steel angles, $2.35@$2.40; Universal plates, $2.55; sheared plates, $2.50; tees, $2.85@$3; beams and channels, $3.20. Store prices are: Angles, $2.50@$2.60; tees, $3@$3.10, and beams and channels, $3.50@$3.70.

**Bar Iron.**—Demand as reported is surprisingly large. There is no apparent falling off in the railway orders for iron for repairs. Local mills quote $1.85@$1.90 for bar half extras. Valley mills ask $1.75 f.o.b. mill for late deliveries on desirable specifications. Here $1.80 is quoted for car iron. Dealers ask $2.10@$2.20, according to quality and quantity.

**Black Sheet Iron.**—There is a heavy demand for black sheet iron products of all kinds, and prices for sheets at mills are, for No. 27 f. o. b. cars, Chicago $3.05, for new orders $3.10 is asked. Stores quote $3.20 for No. 24; $3.30 for Nos. 25 and 26, and $3.40 for No. 27.

**Galvanized Sheet Iron.**—Demand is good from manufacturing consumers and dealers. Mills are busy and prices well maintained. The discount for both cheap and standard brands is 60 per cent. on Juniata and 60 and 5 per cent. on charcoal from store. Jobbing lots are quoted according to quantity ordered.

**Merchant Steel.**—There is still a good demand for merchant steel, and a fair request is also reported for tool and special qualities. The volume of tonnage moving is excellent for the season. Prices are firm and unchanged. We quote as follows: Tool steel, $7.75@$8; specials, $12@$25; open-hearth machinery, $3; Bessemer machinery, $2.50@$2.70; open-hearth spring steel, $2.75@$2.80; tire, $2.50@$2.60; toe calk, $2.70@$2.80; sleigh shoe, $2.40@$2.50; cutter shoe (T. & B.), $2.65@$2.70; crucible sheet steel, $7@$10; crucible spring, $3.75.

**Plates, Tubes, etc.**—Great improvement in delivery from mills is noted. They are still two or three weeks behind with orders. New business is good from warehouses and mills. Prices are held firmly up to current rates. Tank iron, $2.70; tank steel, $2.90; heavy sheets from 10 to 14, $2.90@$3; steel sheets 10 to 14, $3.25@$3.50; shell iron, $3@$3.25; flange iron, $4@$4.25; flange steel, $3.50; shell steel, $3.25; boiler rivets, $4@$4.25; fire box iron and steel, $4.75@$5.50; boiler tubes, 4½ inches and larger, 52½ per cent.; 2 to 4 inches, 50 per cent., and 1¾ inches and smaller, 45 per cent.

**Nails.**—The market for steel cut nails is reported somewhat weaker and prices irregular. As is usually the case at this season, the demand is falling off. Quotations at mill is $1.70 per keg. Freights from Wheeling are now 17½ cents. Prices here indicate a weakness; nails are selling at $1.90 in car lots and at $2.00 in smaller quantities. Wire nails remain unchanged at stores from $2.50 to $2.55 per keg, in car lots $2.45.

**Steel Rails.**—Recent business was confined to small lots at $32@$32.50 for prompt delivery. The demand is reported very large, and should only a

portion of the inquiries now on the market be placed, prices will be advanced. The prospects are excellent for an enlarged spring delivery in the Chicago market.

**Railway Track Supplies.**—With the reported increase in business for repair material a scarcity of spikes is noted. Prices are: Iron fish plates, $2.15@$2.20; steel fish plates, $2.25@$2.30; bolts, square nuts, $3@$3.05; hexagon nuts, $3.10@$3.15; spikes, $2.30@$2.35, according to quantity.

**Scrap Iron.**—Trade is very light and purchasers few and hard to find. We quote as follows: Country mixed scrap, $15.50@$16.50, according to condition; No. 1 mill, $14@$14.50; light wrought, $9@$9.50; horseshoes, $19@$19.50; axles, $26; cast machinery, $12; stove plates, $9.50@$10; borings, $9.50@$10; wrought turnings, $13.50; No. 1 railroad shop or forge, $20; track scrap, $19.

**Old Wheels and Rails.**—The tightness of money is given as a reason for the present very unsatisfactory condition of the market in old wheels and rails. Old iron rails are held at $25@$25.50 f.o.b. Chicago; steel rails are steady at $18, according to condition; guards and frogs, $15.50; old car wheels are quiet and bring $17@$17.50.

**Louisville.** Nov. 18.

[Special Report by Messrs. Hall Bros. & Co.]

Notwithstanding the market in general has ruled quiet for the past week and orders have not been so numerous, yet, on the whole, a larger volume of business has been placed than for some two weeks preceding. Several individual orders ranging in quantities from 1,000 to 2,000 tons have been taken, particularly for irons for special purposes. Most of the trade is confined to legitimate requirements for a few months ahead, as buyers are somewhat dubious about the course of the money market, and, in consequence, are not anticipating as largely for their probable future requirements as they otherwise would. Rumors are current of sales in coke irons at materially reduced figures, and recent developments have disclosed evidences in corroboration of same, though some of the furnaces report their order books well filled for the next 60 days and are holding rather firm.

**Hot Blast Foundry Irons.**—Southern coke, No. 1, $15@$15.25; No. 2, $14.25@$14.50; No. 3, $14@$14.25. Mahoning Valley, lake ore mixture, $17.75@$18.75; Southern charcoal, No. 1, $17@$17.50; No. 2, $16.50@$17. Missouri charcoal, No 1, $18@$18.50; No. 2, $17@$17.50.

**Forge Irons.**—Neutral coke, $13.75@$14; cold short, $13.75@$14; mottled, $12.75@$13.25.

**Car Wheel and Malleable Irons.**—Southern, standard brands, $22@$23; other brands, $18@$19. Lake Superior, $22.50@$23.

**Philadelphia.** Nov. 21.

(From our Special Correspondent.)

**Pig Iron.**—The point to which the attention of both makers and buyers of iron is especially directed is the effect that the financial flurry may have on the iron trade in restricting winter business. Opinions are divided. If there should be a material falling off in the new enterprises talked of, and should projected operations be postponed, both sides admit that the situation would change. As yet confidence is unshaken, and prices remain where they were, viz: $18@$18.50 for standard No. 1, and $17.50 for ordinary; $17@$17.50 for standard No. 2, and $16.50 for ordinary; and $15@15.50 for standard forge. Demand continues good. Bessemer moves slowly at $18@$18.25.

**Spiegel and Ferromanganese.**—Buyers have offered $30.50@$31 for spiegel. Ferromanganese is to be had at $68.

**Muck Bars.**—Buyers are hanging back in view of the possibility of easier prices, but makers stand by $30.

**Steel Billets.**—Large lots are wanted, but buyers look for lower prices than $30@30.50. Nail slabs are active at $29.50.

**Merchant Iron.**—Large lots of medium iron are wanted, but a difference of about $2 per ton exists between buyers and sellers. There is a further decline in business, and this is the reason given by buyers for expecting lower prices.

**Nails.**—Nails sell well considering the lateness of the season. Mills are generally running. Prices: $1.75@$1.90; stores, $2@$2.10.

**Sheet Iron.**—Easier prices prevail where large orders are to be secured. Manufacturers do not think permanently lower prices probable. On ordinary business card rates continue, viz., $3@$3.70 for best refined.

**Skelp.**—Prices are slightly easier, or appear so on account of the offerings of large orders, which manufacturers are naturally anxious to obtain.

**Wrought Iron Pipe.**—Tubes and small pipe orders are crowding in and prices are strong on nearly all orders accepted.

**Plate and Tank.**—There is also a slight downward tendency observable in this branch, due to the desire of mill men to obtain prompt cash. Winter business is offering in encouraging proportions. Steel ship plates are: $2.50 steel, iron, $2.25.

**Structural Iron.**—Angles sell at $2.40, plates 2.30, tees $2.70. Mills continue to be crowded, and on all ordinary business concessions are unknown.

**Steel Rails.**—Quotations are $29 for large lots and $30 for small lots. A great deal of business is hanging fire.

**Old Rails.**—In the absence of recent sales or offerings it is impossible to state prices.

**Scrap.**—Railroad scrap sold to-day at $23.50.

**Pittsburg.** Nov. 20.

(From our Special Correspondent.)

**Raw Iron and Steel.**—The market since our last report has presented nothing of special importance. The unsettled condition of the money market continues to interfere with the iron business, causing many buyers to defer closing contracts until money matters become more settled. All things taken into consideration, sales show up fairly well; the demand for Bessemer pig has been large, many of the orders being for deliveries during the first three months in 1891. This looks well for the new year, showing conclusively that the general outlook is a good one; prices were fairly mantained. Reports from the Mahoning and Shenango valley, indicate that most of the furnaces are well sold up. The valley sales of "valley Bessemer" have been large, including several blocks of 5,000 and 6,000 tons.

In regard to the future there is a wide difference of opinion among dealers, each side contending that its views are the correct ones. There will, undoubtedly, be a falling off in the volume of business for some weeks to come. Grey forge: the demand has been light, compared with other descriptions. Consumers appear to have sufficient on hand to meet present wants. As a general thing, city furnace-made iron is held out of the market for the present, furnace men not being disposed to accept prices offered, contending that standard brands of iron are worth more money than is now offered.

Outside and unknown brands are occasionally being disposed of at various prices. Consumption for some time has been the largest in the history of the trade. Notwithstanding the amount sold does not appear large; when the same comes to be footed up the totals show that a large amount of iron has changed hands. There seems to be more competition than formerly, however, so that a great deal of effort is required to find a place for all that is offered. The same conditions seem to prevail in other important centers, so that in spite of the many apparently serious drawbacks, the outlook for the trade is considered to be one of the most hopeful character. Muck bar: while the demand is less active than formerly, business in that line shows up well, with prices fairly maintained; sales for the past six weeks exceed all previous records. Billets and slabs: the demand was less active; dealers seem to be supplied for the present; prices are fairly maintained.

Ferro-manganese. for January delivery, shows a material decline; skelp iron remains steady at last week's prices; scrap material, prices fairly maintained; old iron and steel rails are weaker, not quotably lower; manufactured iron, manufacturers report business active in filling previous contracts.

*Coke Smelted Lake and Native Ores.*

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| 6,500 Tons Bessemer, Jan., Feb., March, Wheeling | 17.75 cash. |
| 5,000 Tons Bessemer, Jan., Feb., March, Pittsburg | 17.25 cash. |
| 4,000 Tons Bessemer, Nov., Dec., Pittsburg | 17.15 cash. |
| 2,000 Tons Bessemer. Jan., Feb., March | 17.25 cash. |
| 3,000 Tons Bessemer. Jan., Feb, March | 17.25 cash. |
| 2,000 Tons Grey Forge | 15.00 cash |
| 1,250 Tons Grey Forge | 15.00 cash. |
| 1 000 Tons Bessemer, No. 1 City Furnace | 17.50 cash. |
| 1,000 Tons Grey Forge | 15.00 cash. |
| 1,000 Tons Bessemer, Dec., Jan | 17.25 cash. |
| 500 Tons Grey Forge | 15 00 cash. |
| 500 Tons No. 1 Foundry | 16.75 cash. |
| 500 Tons Bessemer, Jan., Feb., March | 17.20 cash. |
| 100 Tons No. 2 Foundry | 16.00 cash. |
| 100 Tons No. 2 Foundry, all ore | 17.50 cash. |
| 600 Tons White Southern Iron | 14.00 cash. |
| 75 Tons Silvery, extra | 19.50 cash. |

*Muck Bar.*

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| 3,000 Tons Neutral, December, January and February | 31.25 cash. |
| 1,500 Tons Neutral | 31.25 cash. |
| 1,500 Tons Neutral, January and Februrary | 31.00 cash. |
| 1,000 Tons Neutral | 31.25 cash. |
| 500 Tons Neutral | 31.00 cash. |

*Steel Slabs and Billets.*

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| 3,000 Tons Rod Billets, January and February | 28.15 cash. |
| 2,000 Tons Billets. January and February | 28.00 cash. |
| 500 Tons Billets | 28.00 cash. |

*Skelp Iron.*

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| 400 Tons Sheared Iron | 2.30 | 4 m. |
| 365 Tons Narrow Grooved | 1.95 | 4 m. |
| 235 Tons Wide Grooved | 2.00 | 4 m. |

*Ferro-Manganese.*

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| 150 Tons 80 per cent. at Jersey City | 64.00 cash. |

*Bloom Ends.*

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| 375 Tons Bloom Ends | 18.50 cash. |

*Steel Wire Rods.*

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| 5,600 Tons American Fives | 39.00 cash. |

*Old Iron Rails.*

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| 1,000 Tons American Ts, Valley delivery. | 28.50 cash. |
| 500 Tons American Ts | 28.20 cash. |
| 500 Tons American Ts | 27.75 cash. |
| 300 Tons American Ts | 27.50 cash. |

## CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 21.

**Heavy Chemicals.**—Generally speaking, the market for heavy chemicals is quiet and the volume of business has not increased perceptibly. We hear of some heavy contracts for next year, and now that the much-talked of "chemical union" is established consumers are beginning to display more interest as to the future, although speculative tendency is conspicuous for its absence. From our Liverpool advices we learn that the chemical syndicate has been registered under the name of "United Alkali Company, Limited," and prospectus, marked "for private circulation only," have been received in this city. The share capital is £6,000,000 sterling in addition to £2,500,000 of five per cent. debenture stock. It was at first the intention to register the concern as the "United Chemical Company, Limited," but this name had been previously registered by a company which, years ago, came to naught. It is said that already £1,500,000 has been subscribed and applications are still coming in. Important changes in values have resulted, as will be seen below.

Caustic Soda.—The 60 per cent. variety appears to be in little demand; but as the spot supply is limited, holders ask 3·75@4c. To arrive, 3·37½@3·45c. is asked. For 70-74 per cent., on the spot, we quote 3·10@3·15c. and 3·05@3·10c. to arrive, although higher prices are asked by some dealers.

Carbonated Soda Ash.—There is but a limited spot supply and a corresponding firmness in this article. For 48 per cent., spot or near-by delivery, quotations are 1·60@1·65c., and for 58 per cent., 1·55@1·60c. We hear of no particularly large business, but there seems to be considerable inquiry for it from glass makers and others.

Caustic Soda Ash.—This article is very scarce on the spot, quotations for 48 per cent. being 1·60 and 1·55 for 58 per cent. The market is dull for both brands, especially for the latter.

Sal Soda.—Not much is doing in sal soda, which, however, is firm both here and in Liverpool. We quote 1·17½@1·20c., according to quantity.

Salt Cake.—A hand-to-mouth buying is doing at 70@75c. for either imported or domestic, according to quantity and quality.

Bleaching Powder.— At the present writing bleach is, so to speak, the most interesting of the chemicals. The spot supply is very light, prices have advanced and a higher tendency is observed. Some sales are reported at prices as high as 2@2·5c. in Boston, and 2c. in Philadelphia. Quotations here are 1·80@1·85c. to arrive, according to brand, and reference to our Liverpool letter will show that on the other side bleach is also in a rather excited state.

It is reported that an English syndicate has purchased the great soda deposits of Wyoming at a very high price. Some of these deposits are extremely valuable, but their distance from market will always leave a safe margin for well situated Eastern works to operate on.

**Acids.**—Business in the acid market is pretty much as recently reported, only that whereas a month ago makers *unanimously* reported a very good volume of business, we now hear from some that this has decreased. This being so the prospects of higher prices daily become less promising, notwithstanding the fact that the Knickerbocker Chemical Company is reported as being busily engaged in elaborating a plan whereby the present troubles in this market are to disappear.

What really is the most important question before the makers of sulphuric acid is the advance in the prices of brimstone. At the present low price of acid it is impossible to manufacture and sell oil of vitriol at a profit with sulphur at $26, and with but little prospect of an early decline from this. Manufacturers who have hitherto used brimstone are turning their attention to pyrites, and we hear of one maker—a member of the "combination"—who is said to have been forced to buy pyrites acid in order to fill his orders.

The outcome of the problem thus thrust upon acid makers will be watched with interest by all, especially by those who claim that for most purposes acid made from pyrites is as good as that made of Sicily brimstone. No better time than the present has existed for the exploitation of the native sulphur deposits which exist in Utah, Louisiana and other places.

Prices remain unchanged and we continue to quote, acid per 100 pounds in New York and vicinity: Acetic, $1.72½@$2.20; muriatic, 18-degree-90c@$1.20; muriatic, 20-degree, 95c.@$1.50; muriatic, 22-degree, $1@$1.75; nitric, 36-degree, $3@$3.25; nitric, 40-degree, $3.50@$4.50; nitric, 42-degree, $4@$4.75; sulgphuric, 60-degree, 70@80c., and sulphuric, 66-deree, 80@95c.

**Fertilizing Chemicals.**—Only the fair amount of business customary at this time of the year is doing. Prices do not show much change, the only exception being in the potash salts. We quote: High grade dried blood $1.80@$1.85. For the low grade the price is $1.70@$1.75. Azotine, $1.85@$1.90. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $19@$20 per ton, and low grade 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.25@$18.75. Fish scrap, $19@$19.50 per ton f.o.b. factory. Sulphate of ammonia, prime gas liquor, $3.25; prime bone liquor, $3.10@$3.15, with a fair demand. Concentrated tankage, $1.67½@$1.70. Refuse, bone black, guaranteed 70 per cent. phosphate, $17@$17.50 per ton. Dissolved bone black is nominally 95c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $7@$7.50 per ton; kiln-

dried, $7 per ton; f. o. b. vessels and cars, $7.25.@$7.75, according to time of delivery. Freights by sail from Charleston to New York, $2.75@$3 per ton. Charleston rock, ground, $11.75@$12.25, ex-vessel at New York.

It was announced during the week that the German Potash Syndicate had reduced prices for next year. High-grade sulphate of potash has been put on the free list by the McKinley bill, and this fact probably prompted the reduction. Provided contracts are entered into previous to November 26th, the following are the prices for 1891:

Sulphate of potash, 45 to 52 per cent., $1.07½ per 100 pounds; manure salts, high grade, basis 90 to 95 per cent., $2.02½ per 100 pounds; basis 95 to 97 per cent., $2.05. For immediate delivery last week's prices still hold good, as follows: Sulphate of potash, 48 to 52 per cent., $1.12½ per 100 pounds; manure salts, high grade, basis 90 to 95 per cent., $2.05 per 100 pounds.

Muriate of Potash.—A large number of contracts have been placed for delivery during 1891. Arrivals this week aggregate some 1,300 tons. Prices will remain the same for the rest of this year, *i. e.*, $1.77½@$1.82½. For next year, on contracts signed prior to November 26th, 1890, prices will be $1.77½ for New York; $1.75 for Philadelphia, $1.75 @$1.77½ for Southern ports and $1.80 for Gulf ports. After the date given the advance will be from 2½@5c.

Nitrate of Soda.—The spot supply of nitrate is said to be very light, probably not more than 20,000 bags. Spot quotations are $1.80, and to arrive $1.65@$1.77½, according to time of shipment. By-ports are 2½@5c higher than New York. Sales of 2,000 bags at $1.77½ ex ship and $1.80 ex store are reported.

Brimstone.—Just now the condition of the market for brimstone engrosses the attention of consumers. Prices are very high, and a speculative tendency on the other side will probably prevent any considerable decline. One of the best known dealers in this city has issued a circular in which he states that it looks very much as if there will be a repetition of the market of a few years ago, when prices advanced till $32.50@$35 per ton was paid. Quotations at the present writing are as follows: Ex-steamer, in port, New York, $27; ex-steamer, due at New York in about a fortnight, $26.50; November, or November-December steamer to New York, $26. It is almost needless to say that buyers are not disposed to come into the market at these prices. The market report of Messrs. Emil Fog & Sons, dated Messina, Nov. 1, has the following:

"The course has been steadily upward: the increasing strength of the statistical position and confirmed reports of shortness of production having its effect on values, which, assisted by active demand, advanced beyond the expectations of the most sanguine. Speculation was rife, eagerly taking hold of everything that was offered, seeking also deliveries, during 1891 and 1892, for which full prices were paid. It may not be amiss to give some figures to corroborate the above statement.

| | Tons. |
|---|---|
| Total export from Sicily during January-September, 1890 | 258,400 |
| 1889 | 276,200 |
| Stock, end September, 1890 | 97,900 |
| 1889 | 116,600 |

It is fair to assume that the shortage in our export is likely to be made up before the closing of the year, when we shall have to confront a reduction of about 36,000 T in our visible supply, and no relief is anticipated by the daily arrivals from the mines, as they are about half of what they should be at this season. While everything points to a higher range of values, we beg to draw attention to the fact that it will be to the interest of warehouse men at Girgenti and Licata, between now and December, to depress prices as much as possible, to be enabled to make the most favorable settlements with mine owners who deposit with them. Cost and freight quotations may be slightly reduced by lower freight rates, which are likely to rule during the coming fruit season, but in spring the belief in high prices is general."

**Liverpool.** Nov. 12.

(Special Correspondence by Messrs. J. P. Brunner & Co.)

It is reported that in response to the prospectus of the United Alkali Company, Ltd., issued for private circulation, subscriptions are coming in very freely, and it is said that already £1,500,000 has been subscribed, and applications are still coming in. It is now stated that the response has been so satisfactory that the success of the concern is assured.

Both ash and bleach have been in active request for the balance of this year, and also for delivery over 1891.

Soda Ash.—It is very difficult to find any sellers for the balance of this year, most makers being quite cleared out. For November and December 1⅜ to 1½d. may be quoted as nearest values, but the difficulty is to find any sellers; same quotations are asked for 1891.

Soda crystals are in good request at £3 5s. to £3 7s. 6d. per ton.

Caustic soda dull, but as there is very little to be had in second hands, prices are if anything firmer at: 60 per cent., £10 5s.; 70 per cent., £11 8s. 9d. @ £11 10s.; 74 per cent., £12 10s.; 76 per cent., £13 5s. and upward. For December delivery quotations are 5s. per ton less than spot values, and 10s. per ton for all 1891.

Bleaching powder rampant, and £6 15s. paid for a re-sale parcel to-day, while at the close there are several orders in the market at this price, but no sellers at under £7, and it is very scarce even at the higher figure. For all 1891, business is reported at £7, and also at £7 5s. for a special brand.

Chlorate of potash steady at 5½d. per pound, but not active.

Bicarbonate of soda very scarce at £7 and upward for one cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia flat at about £11 7s. 6d. @ £11 10s. per ton for good gray 24 per cent., in double bags, f.o.b. here.

## BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Nov. 21.

**Brick.**—There is a better demand this week for the various kinds of bricks, and, although it is greater than the supply, it has not been sufficiently great to do away with the entire stock. There remains an accumulation of about 3,000,000. Prices are altogether unchanged, and we can only repeat our last week's quotations, which are as follows: Haverstraw, $5.75@$6.25 per thousand; Uprivers, $5@$5.75; Jerseys, $4.50@$5.25.

**Lime.**—There is rather a quiet market in lime. Very little is coming forward, and as the smaller vessels of the lime fleet are now on their last trip, the carrying capacity will be reduced by fully one half. A good many of the kilns in the Maine district are out, and those that are still going are making only a moderate supply. Despite the assertions of some, the St. John people continue to ship lime to this market, not a very great quantity, it is true, but still rather a fair-sized amount. The profit is necessarily small, when one considers that freight of about 30 cents per barrel, a duty of 15 cents, 5 cents commission to the agents, 25 cents for the barrel itself, has to be paid, exclusive of the cost of labor and of burning. The lime is sold at 80@85c. per barrel and the profit is almost *nil*. The Maine people, for whose exclusive benefit the new duty was put on, say they will not raise the price unless they are forced to do so by a much increased demand. We hardly think such a demand will occur for some time at least, and it behooves the Rockland, Rockport and Thomaston people to keep the present prices as they said they would before the McKinley bill was passed. Our quotations this week are: Rockland lime, common, 90c., and finishing, $1.10; St. John, common and finishing, 85@90c.; Glen Falls, common and finishing, 90c.@$1.10.

**Cement.**—Some cement, especially of the domestic makes, is still coming forward. Business has been fair during the past week, but there is nothing of any particular interest to report. We quote: Rosendale, $1 @$1.10; Portland, American, $2.25@$2.50; foreign, $2.35@$2.75; special brands, $2.60@$2.85; Roman, $2.80@$3; Keene's coarse, $4.50@$5.50; Keene's fine, $7.25@$8.50 per barrel.

## IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM NOVEMBER 8 TO NOVEMBER 15 AND FROM JANUARY 1.

### IMPORTS.

| Spelter. | Week. Tons. | Year. Tons. |
|---|---|---|
| Amer. Metal Co | 50 | 422 |
| Hendricks Bros | | 50 |
| La Marche's Sons, H | | 5 |
| Lewisohn Bros | | 150 |
| Meyer, G. A. & E | | 9 |
| Milne & Co | | 74 |
| Muller, Schall & Co | | 123 |
| Total | 50 | 833 |
| Corres. date, 1889 | 243 | 928 |

| Pig Lead. | Lbs. | Lbs. |
|---|---|---|
| Amer. Metal Co | 1,089 | 1,549 |
| Bruce & Cook | | 25 |
| Caswell, E. A | | 211 |
| Hendricks Bros | | 150 |
| Hooper, B. F | | 100 |
| Leroy Shot & L. Co | 95 | 95 |
| Naylor & Co | | 10 |
| Paulsen, Wm | 100 | 450 |
| Schultz & Co., A | | 98 |
| Sheldon, G. W | | 149 |
| Tatham Bros | 95 | 195 |
| Total | 1,379 | 3,032 |
| Corres. date, 1889 | | 251 |

| Tin. | Tons. | Tons. |
|---|---|---|
| Abbot, Jere, & Co | | 225 |
| Amer. Metal Co | 10 | 2,916 |
| Bidwell & French | | 1,380 |
| Bruce & Cook | | 20 |
| Carter, Hawley & Co | | 80 |
| Cohen & Co., A | | 20 |
| Cohen, H | | 20 |
| Cort & Co., N. L | | 175 |
| Crooke Smelting & Ref. Co | | 6 |
| Crooks & Co., R | | 85 |
| Davol & Son | 2 | 51 |
| Hendricks Bros | 2 | 64 |
| Knauth & Kuhne | | 10 |
| Lehmaier, S., & Co. | 10 | 185 |
| Lewisohn Bros | | 120 |
| Merchant & Co | 35 | 115 |
| Muller, Schall & Co | | 1,000 |
| Naylor & Co | 4 | 1,559 |
| Nissen, Geo | | 10 |
| Phelps, Dodge & Co | 410 | 3,806 |
| Pope, Thos. J. Sons | | 10 |
| Schultz & R | | 75 |
| Thomson, A. A. & Co | | 80 |
| Thomson, D. & Co. | 10 | 117 |
| Tompkins, Geo. V | | 10 |
| Townsend, & Co., J. R | | 50 |
| Trotter & Co., N | | 75 |
| Total | 483 | 12,264 |
| Corres. date, 1889 | | 9,526 |

| Tin Plates. | Boxes. | Boxes. |
|---|---|---|
| Adams & West'ke Co | | 70 |
| Bruce & Cook | 2,158 | 125,763 |
| Byrne & Son | | 1,000 |
| Central Stamp. Co. | 2,307 | 59,601 |
| Coddington & Co | 5,906 | 142,817 |
| Cohn & Co | | 17,647 |
| Con. Fruit Jar Co | | 120 |
| Corbiere F. & Co | 585 | 8,487 |
| Cort & Co | 4,898 | 208,148 |
| Crooks & Co | 7,592 | 98,951 |
| De Milt & Co., H. R | | 13,064 |
| Dickerson, V. D. & Co | 18,035 | 349,734 |
| Fenton, D. E | | 4,491 |
| Habermann, F | | 66 |
| Herring, Chas. E | | 1,000 |
| Iron Clad Mfg. Co | | 597 |
| Lalance & G. M. Co | | 9,118 |
| Lazard Bros | | 1,048 |
| Lehmaier, Schw'z & Co | | 200 |
| Merchant & Co | 1,375 | 29,420 |
| Mersick & Co | 1,223 | 13,430 |
| Morewood & Co | | 40,739 |
| Newell Bros | | 416 |
| Payne, S. H. & Co | | 934 |
| Pratt Mfg. Co | | 95,271 |
| Phelps, Dodge & Co | 36,087 | 744,602 |
| Schneider & Co., J | | 3,365 |
| Shepard & Co., S | | 15,927 |
| Shepherd & Co., W | 300 | 500 |
| Standard Oil Co | 10,120 | 38,963 |
| Taylor, N. & G | | 1,429 |
| Thomson & Co., A. A | 3,964 | 100,190 |
| Warren, J. M | 903 | 5,771 |
| Wheeler & Co | 200 | 30,839 |
| Whittemore & Co | | 15,202 |
| Wolff & Reesing | | 2,077 |
| Wright, Peter & Co | | 227 |
| Total | 85,653 | 2,184,224 |
| Corres. date, 1889 | 56,095 | 2,051,266 |

| Pig Iron. | Tons. | Tons. |
|---|---|---|
| Abbott & Co., Jere | | 250 |
| Baldwin & Co., A | | 807 |
| Baldwin Bros. & Co | | 170 |
| Bartlett, N. S | 100 | 100 |
| Crocker Bros | | 1,515 |
| Crooks & Co., R | | 5 |
| Dana & Co | | 150 |
| Drummond & Co | | 600 |
| Geisenheimer & Co | | 76 |
| Hagermeyer & Brun | | 30 |
| Henderson Bros | | 330 |
| Irvin, R. L. & Co | | 400 |
| Lillienberg, N | | 2,409 |
| Naylor & Co | | 150 |
| Perry & Reyer | | 53 |
| Pierson & Co | | 30 |
| Sheldon, G. W. & Co | | 200 |
| Stetsson & Co., G. W | 250 | 2,975 |
| Williamson, J. & Co | 150 | 2,000 |
| Total | 500 | 12,250 |
| Corres. date, 1889 | 200 | 28,566 |

| Steel Blooms, Billets, and Slabs. | Tons. | Tons. |
|---|---|---|
| Abbott & Co | 125 | 358 |
| Baldwin Bros. & Co | | 2 |
| Dana & Co | | 1,670 |
| Dolge & Co., A | | 1 |
| Downing, R. F. & Co | | 109 |
| Henderson Bros | | 1 |
| Holt & Co., H. N | | 4 |
| Martin & Co | | 80 |
| Milne, A., & Co | | 225 |
| Naylor & Co | | 2,948 |
| Pope, Jas. E., Jr | | 61 |
| Richards & Co., C. B | | 1 |
| Roebling's Sons, J. A | | 2,074 |
| Ward & Co., J. C | | 198 |
| Wolff, & Co., R. H | | 60 |
| Total | 125 | 7,792 |
| Corres. date, 1889 | 361 | 23,526 |

| Bar Iron. | Tons. | Tons. |
|---|---|---|
| Abbott & Co., Jere | | 921 |
| Bacon & Co | | 1,319 |
| Crocker Bros | | 77 |
| Dickerson, Van Dusen & Co | | 6 |
| Downing & Co | | 285 |
| E. J. Jacobus | | 104 |
| Fuller, Dana & Fitz | | 11 |
| Holt, H. N | | 230 |
| Lilienberg, N | | 556 |
| Lundberg, G | 38 | 2,640 |
| Milne & Co | 721 | 1,910 |
| Muller, Schall & Co | 302 | 606 |
| Naylor & Co | 90 | 1,213 |
| Page, Newell & Co | | 1,855 |
| Plenty, J | 9 | 23 |
| Wilson, J. G | | 3 |
| Total | 1,160 | 11,759 |
| Corres. date, 1889 | | 8,909 |

| Scrap Iron. | Tons. | Tons. |
|---|---|---|
| Baldwin Bros. & Co | | 7 |
| Crossman & Co., W. H | 87 | 117 |
| Frankfort, M | | 347 |
| Leary, D | | 27 |
| McDougall & Potter | | 92 |
| Muller, Schall & Co | | 18 |
| Pierson, C. L | | 101 |
| Samper & Co., S | | 186 |
| Stevens, Corvin & Co | | 30 |
| Ward, J. E. & Co | 47 | 884 |
| Total | 134 | 1,709 |
| Corres. date, 1889 | | 3,456 |

| Steel and Iron Rods. | Tons. | Tons. |
|---|---|---|
| Abbott & Co | 204 | 9,712 |
| American S. Co | | 865 |
| Bacon & Co | | 546 |
| Bunnell & Co., J. H | | 50 |
| Carey & Moen | | 569 |
| Cooper, Hewitt & Co | | 371 |
| Dana & Co | | 4,196 |
| Dodge & Co., A | | 3 |
| Downing & Co | 6 | 135 |
| Galpin, S. A | | 1,241 |
| Greely & Co. E. S | | 35 |
| Hastings, W. & S | 4 | 4 |
| Hazard Mfg. Co | 40 | 576 |
| Holt & Co., H. N | | 3 |
| Jacobus, E. Y | | 8 |
| Lee, James & Co | | 1,752 |
| Lillienberg, N | | 300 |
| Lundberg, G | | 157 |
| Lundell, C. G | | 5 |
| Milne & Co | | 1,945 |
| Muller, Schall & Co | | 850 |
| Naylor & Co | | 7,321 |
| Page, Newell & Co | | 1,702 |
| Roebling's Sons, J. A | 120 | 2,807 |
| Sanderson & Son | | 1 |
| Schulze & R | 250 | 251 |
| Taylor, N. L | | 16 |
| Temple & Lockw'd | | 6 |
| Wallace, W | | 5 |
| Wessel & Co | | 21 |
| Wiebusch & Ho | | 4 |
| Wilson, I. M | 29 | 29 |
| Wood & Niebuhr | | 25 |
| Wolf & Co., R. H | 40 | 3,449 |
| Total | 693 | 35,960 |
| Corres. date, 1889 | 575 | 41,978 |

| Old Rails. | Tons. | Tons. |
|---|---|---|
| Bowring & Archibald | | 340 |
| Dana & Co | | 779 |
| Frankfort, M | 225 | 9,238 |
| Henderson Bros | | 300 |
| Hernsheim, L | | 350 |
| Mosle Bros | | 123 |
| Naylor & Co | | 3,099 |
| Sawyer, Wallace & Co | | 610 |
| West, H | | 398 |
| Wiechers, J. F | | 600 |
| Total | 225 | 15,837 |
| Corres. date, 1889 | | 10,609 |

| Spiegeleisen. | Tons. | Tons. |
|---|---|---|
| Abbott, Jere & Co | | 2,725 |
| American Metal Co | | 100 |
| Blakely & McLellan | | 1,684 |
| Crocker Bros | 451 | 24,477 |
| Crooks & Co. R | | 106 |
| Dana & Co | 15 | 15,965 |
| Foley, F | | 50 |
| Geisenheimer & Co. | 100 | 958 |
| Henderson Bros. & Co | | 14 |
| Hernsheim, L | 295 | 21,197 |
| Holt, H. N | | 200 |
| Ivin & Co., R. L | | 50 |
| Naylor & Co | | 13,158 |
| Perkins, C. L | | 1,452 |
| Sachs & Richmond | | 2 |
| Whittemore, H. & Co | | 95 |
| Total | 861 | 82,233 |
| Corres. date, 1889 | 558 | 72,258 |

| Iron Ore. | Tons. | Tons. |
|---|---|---|
| Baiz, Jacob | | 67 |
| Bergen Point Chemical Co | 900 | 4,250 |
| Bowring & Archibald | | 5,292 |
| Earnshaw, A | 177 | 3,851 |
| Ennis, Andrew | | 438 |
| Flores & Co., R. de | | 14,143 |
| Hill, Frank | | 700 |
| Johnson & Co., L | | 5,030 |
| Total | 1,077 | 33,771 |
| Corres. date, 1889 | 2,565 | 12,001 |

### EXPORTS.

| Copper. | Pounds. | Pounds. |
|---|---|---|
| Abbott & Co., Jere | | 2,545,103 |
| Amer. Met. Co., La | | 940,385 |
| Barber & Co | | 13,750 |
| Belmont, Aug. & Co | | 1,125,901 |
| Boker, C. F | | 202,500 |
| Burgass & Co | | 451,953 |
| Funch, Edye & Co | | 135,374 |
| Heidelbach, Ichelheimer & Co | | 672,608 |
| Lewisohn Bros | | 251,478 |
| Muller, Schall & Co | | 33,750 |
| Paulsen, Wm | | 50,000 |
| Sawyer, W'l'ce & Co | | 22,796 |
| Seamen, S. H | | 66,950 |
| Ward, J. E. & Co | | 100,000 |
| Wiechers, J. F | 11,430 | 41,507 |
| Wil'ms & T'hune | | 112,000 |
| Total | 11,430 | 6,768,959 |
| Corre. date, 1889 | 327,041 | 12,690,026 |

| Copper Matte. | |
|---|---|
| American Metal Co | 3,072,079 |
| Lewisohn Bros | 7,278,000 |
| Nichols, Geo. H | 267,202 |
| Paulsen, Wm | 1,149,592 |
| Wil'ms & T'hune | 2,848,706 |
| Total | 14,615,579 |
| Corres. date 1889 | 767,330 31,976,716 |

## DIVIDEND-PAYING MINES.

| | Name and Location of Company. | Capital Stock. | Shares. No. | Par | Assessments. Total levied. | Date and Amount of last | | | Dividends. Total paid. | Date & amount of last. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Adams, s. L. | Colo. | $1,500,000 | 150,000 | $10 | * | | | | $555,000 | Jan. | 1887 .10 |
| 2 | Alice, s. C. | Mont. | 10,000,000 | 400,000 | 25 | * | | | | 850,000 | July | 1890 .06½ |
| 3 | Alma&Nel Wood C.,G | Idaho | 300,000 | 30,000 | 10 | * | | | | 60,000 | Jan. | 1889 .50 |
| 4 | American & Nettie,C. | Colo. | | 300,000 | | | | | | 150,000 | Nov. | 1889 .10 |
| 5 | Amy & Silversmith,s. | Mont. | | 341,419 | | | | | | 247,530 | Aug. | 1887 .12½ |
| 6 | Atlantic, C. | Mich. | 1,000,000 | 40,000 | 25 | $280,000 | April | 1875 | $1.00 | 660,000 | Aug. | 1890 1.00 |
| 7 | Argenta, s. | Nev. | 10,000,000 | 100,000 | 100 | 335,000 | July | 1889 | .10 | 40,000 | Feb. | 1890 .20 |
| 8 | Aspen Mg. & S., s. L. | Colo. | 2,000,000 | 200,000 | 10 | * | | | | 540,000 | Nov. | 1890 .10 |
| 9 | Aurora, I. | Mich. | 2,000,000 | 100,000 | 20 | * | | | | 155,000 | Oct. | 1887 1.37½ |
| 10 | Badger, s. | Ont. | 250,000 | 50,000 | 5 | | | | | 37,500 | Mar. | 1890 .25 |
| 11 | Bassick, G. S. | Colo. | 10,000,000 | 100,000 | 100 | * | | | | 400,000 | Mar. | 1884 1.00 |
| 12 | Belle Isle, s. | Nev. | 10,000,000 | 100,000 | 100 | 190,000 | Dec. | 1889 | .15 | 300,000 | Dec. | 1879 .25 |
| 13 | Belcher, G. S. | Nev. | 10,400,000 | 104,000 | 100 | 2,978,000 | June | 1890 | .50 | 15,397,000 | April | 1876 1.00 |
| 14 | Bellevue, Idaho, s. L. | Idaho | 1,250,000 | 125,000 | 10 | 120,000 | Dec. | 1889 | .25 | 200,000 | Jan. | 1887 .10 |
| 15 | Bi-Metallic, s. | Mont. | 5,000,000 | 200,000 | 25 | | | | | 270,000 | Nov. | 1890 .35 |
| 16 | Bodie Con., G. S. | Cal. | 10,000,000 | 100,000 | 100 | 575,000 | Nov. | 1889 | .25 | 1,602,572 | April | 1885 .50 |
| 17 | Boston & Mont., G. | Mont. | 2,500,000 | 250,000 | 10 | * | | | | 520,000 | June | 1886 1.15 |
| 18 | Boston & Mont., C. S. | Mont. | 2,500,000 | 100,000 | 25 | * | | | | 1,450,000 | Aug. | 1890 .50 |
| 19 | Breece, s. | Colo. | 5,000,000 | 200,000 | 25 | * | | | | 2,300 | Feb. | 1890 .01 |
| 20 | Brooklyn Lead, L. S. | Utah | 500,000 | 50,000 | 10 | | | | | 127,000 | July | 1887 .05 |
| 21 | Bulwer, G. | Cal. | 10,000,000 | 100,000 | 10 | 130,000 | Aug. | 1889 | .25 | 175,000 | Jan. | 1884 .10 |
| 22 | Bunker Hill & Sull. | Idaho | 3,000,000 | 300,000 | 10 | * | | | | 150,000 | Mar. | 1883 .06⅔ |
| 23 | Caledonia, G. | Idaho | 10,000,000 | 100,000 | 100 | 505,000 | May | 1885 | .15 | 194,000 | Oct. | 1890 .08 |
| 24 | Calliope, s. | Colo. | 1,000,000 | 1,000,000 | | | | | | 90,000 | April | 1890 .01 |
| 25 | Calumet & Hecla, C. | Mich. | 2,500,000 | 100,000 | 25 | 1,200,000 | | | | 34,350,000 | May | 1890 5.00 |
| 26 | Carbonate Hill, s. L. | Colo. | 1,500,000 | 200,000 | 10 | * | | | | 80,000 | April | 1884 .05 |
| 27 | Carlisle, G. | N. M. | 1,000,000 | 200,000 | 5 | | | | | 175,000 | Dec. | 1888 .12½ |
| 28 | Castle Creek, G. | Idaho | 100,000 | 100,000 | 1 | | | | | 51,000 | Oct. | 1883 .03 |
| 29 | Catalpa, s. L. | Colo. | 3,000,000 | 300,000 | 10 | * | | | | 270,000 | May | 1884 .10 |
| 30 | Central, C. | Mich. | 500,000 | 20,000 | 25 | 100,000 | Oct. | 1861 | .65 | 1,950,000 | Feb. | 1890 1.00 |
| 31 | Chrysolite, s. L. | Colo. | 10,000,000 | 200,000 | 50 | * | | | | 1,650,000 | Dec. | 1884 .25 |
| 32 | Colorado Central,s.L. | Colo. | 2,750,000 | 275,000 | 10 | * | | | | 406,250 | Aug. | 1889 .05 |
| 33 | Commonwealth, s. | Nev. | 10,000,000 | 100,000 | 100 | 170,000 | Nov. | 1888 | .50 | 20,000 | Nov. | 1890 .20 |
| 34 | Confidence, s. L. | Nev. | | 24,960 | | 328,880 | May | 1890 | .75 | 199,680 | April | 1890 1.00 |
| 35 | Cons. Cal. & Va., G. S. | Nev. | 21,600,000 | 216,000 | 100 | 100,000 | Jan. | 1885 | .20 | 3,466,800 | April | 1890 .25 |
| 36 | Contention, s. | Ariz. | 12,500,000 | 250,000 | 50 | | | | | 12,587,500 | Dec. | 1884 .25 |
| 37 | **Cop. Queen Con., C. | Ariz. | 1,400,000 | 140,000 | 10 | | | | | 210,000 | Feb. | 1889 .50 |
| 38 | Crescent, s. L. G. | Utah | 15,000,000 | 600,000 | 25 | * | | | | 228,000 | Oct. | 1888 .03 |
| 39 | Crown Point, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 2,425,000 | Sept. | 1889 | .50 | 11,588,000 | Jan. | 1875 2.00 |
| 40 | Daly, s. L. | Utah | 3,000,000 | 150,000 | 20 | | | | | 1,706,500 | Nov. | 1890 .25 |
| 41 | Deer Creek, s. G. | Idaho | 1,000,000 | 200,000 | 5 | * | | | | 20,000 | Dec. | 1889 .05 |
| 42 | Deadwood-Terra, G. | Dak. | 5,000,000 | 200,000 | 25 | * | | | | 1,000,000 | Nov. | 1887 .10 |
| 43 | Derbec B. Grav., G. S. | Cal. | 10,000,000 | 100,000 | 100 | 90,000 | Dec. | 1881 | .10 | 240,000 | Oct. | 1890 .10 |
| 44 | Dunkin, s. L. | Colo. | 5,000,000 | 200,000 | 25 | * | | | | 390,000 | Oct. | 1889 .05 |
| 45 | Dunstone, G. S. L. | Mont. | 1,000,000 | 200,000 | 5 | * | | | | 6,000 | Nov. | 1888 .03 |
| 46 | Eclipse. | Colo. | 100,000 | 100,000 | 1 | | | | | 20,000 | Nov. | 1887 .10 |
| 47 | Elkhorn, G. S. | Mont. | 1,000,000 | 100,000 | 10 | 50,000 | July | 1883 | .50 | 850,000 | July | 1887 .05 |
| 48 | Empire Lt., G. | Mont. | 500,000 | 100,000 | 5 | | | | | 70,500 | Oct. | 1887 .37½ |
| 49 | Eureka Con., G. S. L. | Nev. | 5,000,000 | 50,000 | 100 | 550,000 | June | 1889 | .50 | 4,892,500 | Oct. | 1890 .25 |
| 50 | Evening Star, S. L. | Colo. | 500,000 | 50,000 | 10 | * | | | | 1,458,000 | Dec. | 1889 .25 |
| 51 | Excelsior, G. | Cal. | 10,000,000 | 100,000 | 100 | 563,000 | Sept. | 1885 | 1.03 | 875,000 | Oct. | 1890 .25 |
| 52 | Father de Smet, G. | Dak. | 10,000,000 | 100,000 | 100 | 200,000 | Nov. | 1878 | 1.00 | 1,125,000 | Dec. | 1885 .30 |
| 53 | Franklin, C. | Mich. | 1,000,000 | 40,000 | 25 | 224,000 | June | 1871 | | 960,000 | Jan. | 1889 2.00 |
| 54 | Freeland, G. S. | Colo. | 5,000,000 | 200,000 | 25 | * | | | | 190,000 | July | 1886 .10 |
| 55 | Garfield Lt., G. S. | Nev. | 500,000 | 100,000 | 5 | | | | | 95,000 | April | 1888 .12½ |
| 56 | Gould & Curry, G. S. | Nev. | 10,800,000 | 108,000 | 100 | 3,988,800 | Sept. | 1890 | .25 | 2,826,000 | Oct. | 1870 10.00 |
| 57 | Grand Prize, s. | Nev. | 10,000,000 | 100,000 | 100 | 785,000 | Jan. | 1890 | .30 | 525,000 | Jan. | 1890 .30 |
| 58 | Granite, s. L. | Idaho | 500,000 | 500,000 | 1 | * | | | | 28,400 | Oct. | 1889 .02 |
| 59 | Granite Mountain, s. | Mont. | 10,000,000 | 400,000 | 25 | | | | | 9,320,000 | July | 1890 .50 |
| 60 | Green Mountain, G. | Cal. | 1,250,000 | 125,000 | 10 | * | | | | 212,500 | Nov. | 1881 .07½ |
| 61 | Hale & Norcross, G. S. | Nev. | 11,200,000 | 112,000 | 100 | 5,142,800 | April | 1890 | .50 | 1,162,000 | July | 1888 .50 |
| 62 | Hecla Con., S. G. L. C. | Mont. | 1,500,000 | 30,000 | 50 | | | | | 1,500,000 | April | 1889 .50 |
| 63 | Hel'a Mg.& Red,G.S.L. | Mont. | 3,315,000 | 663,000 | 5 | * | | | | 197,979 | July | 1886 .06 |
| 64 | Holmes, s. | Nev. | 10,000,000 | 100,000 | 100 | 370,000 | May | 1890 | .25 | 75,000 | April | 1886 .25 |
| 65 | Holyoke, G. | Idaho | 2,110,000 | 200,000 | 1 | | | | | 37,000 | Feb. | 1883 .10 |
| 66 | Homestake, G. | Dak. | 12,500,000 | 125,000 | 100 | 300,000 | July | 1878 | 1.00 | 5,606,25 | Nov. | 1890 .10 |
| 67 | Honorine, s. L. | Utah | 500,000 | 250,000 | 2 | 37,500 | April | 1889 | .05 | 125,000 | Sept. | 1887 .05 |
| 68 | Hope, s. | Mont. | 1,000,000 | 100,000 | 10 | * | | | | 233,252 | April | 1888 .25 |
| 69 | Horn-Silver, s. L. | Utah | 10,000,000 | 400,000 | 25 | * | | | | 4,150,000 | June | 1890 .12½ |
| 70 | Hubert, G. | Colo. | 1,000,000 | 1,000,000 | 1 | * | | | | 247,000 | Dec. | 1889 .00½ |
| 71 | Idaho, G. | Cal. | 310,000 | 3,100 | 100 | | | | | 5,235,900 | Dec. | 1889 5.00 |
| 72 | Ideal, s. L. | Colo. | 1,500,000 | 50,000 | 10 | | | | | 15,000 | Oct. | 1887 .05 |
| 73 | Illinois, s. | N. M. | 100,000 | 100,000 | 1 | * | | | | 45,000 | April | 1889 .20 |
| 74 | Independence, s. | Nev. | 10,000,000 | 100,000 | 100 | 340,000 | Oct. | 1886 | .20 | 225,000 | Sept. | 1879 .25 |
| 75 | Iron Hill, s. | Dak. | 2,500,000 | 250,000 | 10 | 134,000 | July | 1889 | .03 | 156,250 | Nov. | 1887 .07½ |
| 76 | Iron-Silver, s. L. | Colo. | 10,000,000 | 500,000 | 20 | * | | | | 2,500,000 | April | 1889 .20 |
| 77 | Jackson, G. S. | Nev. | 5,000,000 | 50,000 | 100 | 237,500 | Nov. | 1880 | .20 | 55,000 | June | 1889 .10 |
| 78 | Jay Gould. | Mont. | 2,000,000 | 40,000 | 5 | * | | | | 459,000 | May | 1890 .04 |
| 79 | Jocalitta, L. | Mex. | 2,500,000 | 250,000 | 10 | | | | | 1,200,000 | Feb. | 1885 .50 |
| 80 | Jumbo, G. | Colo. | 2,000,000 | 200,000 | 10 | | | | | 35,000 | Oct. | 1887 .02½ |
| 81 | Kearsarge, C. | Mich. | 1,250,000 | 50,000 | 25 | 190,000 | Oct. | 1887 | 1.00 | 100,000 | Jan. | 1890 2.00 |
| 82 | Kentuck. | Nev. | 3,000,000 | 30,000 | 100 | 406,930 | Aug. | 1890 | .30 | 1,350,000 | Dec. | 1886 .10 |
| 83 | La Platta, s. L. | Colo. | 2,000,000 | 200,000 | 10 | * | | | | 610,000 | Sept. | 1882 .30 |
| 84 | Leadville Con., S. L. I. | Colo. | 4,000,000 | 400,000 | 10 | * | | | | 4,423,000 | April | 1889 .05 |
| 85 | Lexington, G. S. | Mont. | 4,000,000 | 400,000 | 10 | * | | | | 600,000 | Jan. | 1885 2.00 |
| 86 | Little Chief, s. L. | Colo. | 10,000,000 | 200,000 | 50 | * | | | | 820,000 | Dec. | 1890 .05 |
| 87 | Little Pittsburg, s. L. | Colo. | 20,000,000 | 200,000 | 100 | * | | | | 1,050,000 | Mar. | 1890 .50 |
| 88 | Little Rule. | Colo. | 500,000 | 500,000 | 1 | | | | | 30,000 | June | 1890 .02 |
| 89 | Mammoth. | Utah | 10,000,000 | 400,000 | 25 | | | | | 480,000 | Aug. | 1890 .10 |
| 90 | Martin White, s. | Nev. | 10,000,000 | 100,000 | 100 | 1,225,000 | Oct. | 1890 | .25 | 143,000 | Dec. | 1890 .25 |
| 91 | Mary Murphy, G. S. | Colo. | 350,000 | 3,500 | 100 | * | | | | 175,000 | May | 1888 5.00 |
| 92 | Matchless, s. | Colo. | 500,000 | 500,000 | 1 | | | | | 15,000 | Feb. | 1890 .00½ |
| 93 | May Mazeppa. | Colo. | 1,000,000 | 100,000 | 1 | | | | | 60,000 | Nov. | 1890 .01 |
| 94 | Minnesotta, C. | Mich. | 1,000,000 | 40,000 | 25 | 420,000 | April | 1886 | 1.00 | 1,820,000 | Mar. | 1876 |
| 95 | Mono, G. | Cal. | 5,000,000 | 50,000 | 100 | 760,000 | Sept. | 1890 | .25 | 12,500 | Mar. | 1886 .25 |
| 96 | Montana, Lt., G. S. | Mont. | 3,300,000 | 660,000 | 5 | * | | | | 2,489,675 | Oct. | 1890 .06 |
| 97 | Morning Star, s. L. | Colo. | 1,000,000 | 100,000 | 10 | | | | | 550,000 | Dec. | 1890 .20 |
| 98 | Moulton, S. G. | Mont. | 2,000,000 | 400,000 | 5 | * | | | | 380,000 | Dec. | 1887 .07½ |
| 99 | Mount Pleasant, G. | Cal. | 150,000 | 150,000 | 1 | * | | | | 150,000 | Feb. | 1887 .30 |
| 100 | Mt. Diablo, s. | Nev. | 5,000,000 | 50,000 | 100 | 137,500 | June | 1880 | 2.00 | 160,000 | Oct. | 1889 .20 |
| 101 | Napa, Q. | Cal. | 700,000 | 100,000 | 7 | | | | | 380,000 | Oct. | 1890 .10 |
| 102 | Navajo, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 500,000 | April | 1890 | .15 | 365,000 | April | 1889 .10 |
| 103 | New Guston, G. | Colo. | 500,000 | 100,000 | 5 | * | | | | 357,500 | April | 1890 .50 |
| 104 | N. Hoover Hill, G. S. | N. C. | 300,000 | 120,000 | 2½ | * | | | | 30,000 | Dec. | 1885 .06⅔ |
| 105 | Northern Belle, s. | Nev. | 5,000,000 | 50,000 | 100 | 425,000 | Jan. | 1884 | 8.00 | 2,400,000 | April | 1883 .50 |
| 106 | North Belle Isle, s. | Nev. | 10,000,000 | 100,000 | 100 | 395,000 | April | 1890 | .20 | 230,000 | May | 1888 .50 |
| 107 | North Star, G. | Cal. | 1,000,000 | 100,000 | 10 | | | | | 250,000 | Dec. | 1889 .50 |
| 108 | Ontario, s. L. | Utah | 15,000,000 | 150,000 | 100 | | | | | 11,450,000 | Nov. | 1890 .50 |
| 109 | Ophir, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 4,210,640 | April | 1890 | .50 | 1,595,380 | July | 1882 1.00 |
| 110 | Original, S. C. | Mont. | 1,500,000 | 60,000 | 25 | * | | | | 123,000 | July | 1888 .05 |
| 111 | Oro. | Colo. | 500,000 | 100,000 | 5 | | | | | 60,000 | June | 1890 .20 |
| 112 | Osceola, C. | Mich. | 1,250,000 | 50,000 | 25 | 480,000 | April | 1876 | 1.60 | 1,447,500 | Dec. | 1890 1.50 |
| 113 | Oxford, G. | N. S. | 125,000 | 125,000 | 1 | * | | | | 78,500 | Sept. | 1888 .02 |
| 114 | Paradise Valley, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 57,000 | April | 1888 | .15 | 150,000 | April | 1887 .10 |
| 115 | Parrot, C. | Mont. | 1,800,000 | 180,000 | 10 | * | | | | 696,000 | Sept. | 1890 .10 |
| 116 | Peacock, S. | N. M. | 2,000,000 | 200,000 | 10 | * | | | | 60,000 | Nov. | 1886 |
| 117 | Plumas Eureka, G. | Cal. | 1,406,250 | 140,625 | 10 | | | | | 2,548,046 | Oct. | 1889 .37½ |
| 118 | Plutus, G. S. C. L. | Colo. | 2,000,000 | 200,000 | 10 | * | | | | 20,000 | Feb. | 1886 .10 |
| 119 | Plymouth Con., G. | Cal. | 5,000,000 | 100,000 | 50 | * | | | | 2,280,000 | Feb. | 1888 .40 |
| 120 | Quicksilver, pref., Q. | Cal. | 4,300,000 | 43,000 | 100 | | | | | 1,705,791 | Aug. | 1890 1.50 |
| 121 | " com., Q. | Cal. | 5,700,000 | 57,000 | 100 | | | | | 543,867 | July | 1882 .40 |
| 122 | Quincy, C. | Mich. | 1,000,000 | 40,000 | 25 | 200,000 | Dec. | 1862 | | 5,570,000 | Aug. | 1890 5.00 |
| 123 | Republic, C. | Mich. | 5,000,000 | 100,000 | 50 | 400,000 | Dec. | 1889 | .30 | 4,312,587 | June | 1887 1.25 |
| 124 | Richmond, S. L. | Nev. | 1,350,000 | 54,000 | 25 | * | | | | 99,785 | Feb. | 1890 .50 |
| 125 | Ridge, C. | Mich. | 500,000 | 20,000 | 25 | 219,939 | Mar. | 1886 | .50 | 585,000 | Mar. | 1886 .05 |
| 126 | Robinson Con., S. L. | Colo. | 10,000,000 | 200,000 | 50 | * | | | | 100,000 | Dec. | 1882 .50 |
| 127 | Robert E. Lee, S. L. | Colo. | 10,000,000 | 500,000 | 20 | | | | | 4,460,000 | July | 1889 3.00 |
| 128 | Savage, S. | Nev. | 11,200,000 | 112,000 | 100 | 6,604,000 | Nov. | 1889 | .50 | 7,500 | April | 1863 .01 |
| 129 | Shoshone, G. | Idaho | 150,000 | 150,000 | 1 | | | | | 1,568,145 | April | 1888 .12½ |
| 130 | Sierra Buttes, G. | Cal. | 2,225,000 | 122,500 | 10 | | | | | 102,000 | Jan. | 1871 1.00 |
| 131 | Sierra Nevada, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 6,236,910 | May | 1890 | .50 | 270,000 | April | 1889 .10 |
| 132 | Sierra Nevada, S. L. | Idaho | 1,000,000 | 1,000,000 | 1 | * | | | | 40,000 | May | 1889 .02 |
| 133 | Silver Cord, G. S. L. | Colo. | 4,500,000 | 450,000 | 10 | | | | | 270,000 | April | 1889 .10 |
| 134 | Silver King, S. | Ariz. | 10,000,000 | 100,000 | 100 | 130,000 | Sept. | 1890 | .30 | 1,950,000 | July | 1887 .25 |
| 135 | Silver Mg. of L. V. | N. M. | 500,000 | 500,000 | 1 | | | | | 250,000 | Oct. | 1890 .05 |
| 136 | Silverton, G. S. L. | Colo. | 2,000,000 | 200,000 | 10 | * | | | | 50,000 | Jan. | 1881 .25 |
| 137 | Small Hopes Con., S. | Colo. | 5,000,000 | 250,000 | 20 | * | | | | 2,162,500 | Oct. | 1890 .25 |
| 138 | Spring Valley, G. | Cal. | 200,000 | 200,000 | 1 | 50,000 | Oct. | 1886 | .25 | 3,595,000 | June | 1888 .05 |
| 139 | Standard, G. S. | Cal. | 10,000,000 | 100,000 | 100 | 100,000 | June | 1890 | .50 | 155,000 | Nov. | 1881 .05 |
| 140 | Stormont, L. | Utah | 500,000 | 500,000 | 1 | * | | | | 844,000 | Dec. | 1887 .20 |
| 141 | St. Joseph, L. | Mo. | 1,500,000 | 150,000 | 10 | * | | | | 9,000 | April | 1888 .02½ |
| 142 | Swansea, G. | Colo. | 600,000 | 60,000 | 10 | * | | | | 100,000 | Nov. | 1881 .20 |
| 143 | Tamarack, C. | Mich. | 1,000,000 | 40,000 | 25 | 520,000 | April | 1885 | 3.00 | 1,670,000 | Oct. | 1890 4.00 |
| 144 | Tombstone, G. S. L. | Ariz. | 12,500,000 | 500,000 | 25 | * | | | | 1,250,000 | April | 1882 .10 |
| 145 | United Verde, C. | Ariz. | 3,000,000 | 300,000 | 10 | * | | | | 97,500 | Feb. | 1884 .10 |
| 146 | Valencia, M. | Colo. | 150,000 | 1,500 | 100 | * | | | | 41,250 | April | 1886 2.50 |
| 147 | Viola Lt., G. | Idaho | 750,000 | 150,000 | 5 | | | | | 272,500 | Oct. | 1887 .37½ |
| 148 | Ward Con., S. L. | Colo. | 2,000,000 | 200,000 | 10 | | | | | 20,000 | Dec. | 1889 .05 |
| 149 | Yankee Girl. | Colo. | 2,500,000 | 250,000 | 10 | | | | | 1,275,000 | July | 1887 .10 |
| 150 | Yellow Jacket, G. S. | Nev. | 12,000,000 | 120,000 | 100 | 5,508,000 | Mar. | 1889 | .50 | 2,148,000 | Aug. | 1871 1.50 |
| 151 | Weeb City, L. Z. | Mo. | 55,000 | 11,000 | 5 | | | | | 4,400 | July | 1889 .10 |
| 152 | Woodside. | Utah | | | | | | | | 25,000 | Oct. | 1889 .25 |
| 153 | Young America. | Cal. | | | | | | | | 175,000 | | 1889 .10 |

## NON-DIVIDEND PAYING MINES.

| | Name and Location of Company. | Capital Stock. | Shares. No. | Par | Assessments. Total levied. | Date and am't of last. |
|---|---|---|---|---|---|---|
| 1 | Agassiz Cons., S. L. | Colo. | $2,500,000 | 50,000 | $50 | * |
| 2 | Allegheny, s. | Colo. | 5,000,000 | 500,000 | 10 | |
| 3 | Allouez, C. | Mich. | 2,000,000 | 80,000 | 25 | $737,000 Jan. 1890 .70 |
| 4 | Alpha Con., G. S. | Nev. | 3,000,000 | 30,000 | 100 | 112,500 Sept. 1890 .25 |
| 5 | Alta, s. | Nev. | 10,080,000 | 100,800 | 100 | 3,359,800 Sept. 1890 .50 |
| 6 | Amador, G. | Cal. | 400,000 | 200,000 | 2 | * |
| 7 | American Flag, s. | Colo. | 1,250,000 | 125,000 | 10 | 300,000 June 1887 |
| 8 | Amity, s. | Colo. | 250,000 | 250,000 | 1 | |
| 9 | Anglo-Montana, Lt. | Mont. | 600,000 | 120,000 | 5 | |
| 10 | Astoria, s. | Cal. | 200,000 | 100,000 | 2 | |
| 11 | Barcelona, G. | Nev. | 5,000,000 | 200,000 | 25 | * |
| 12 | Bechtel Con., G. | Cal. | 10,000,000 | 100,000 | 100 | 173,500 Jan. 1883 .10 |
| 13 | Belmont, s. | Nev. | 5,000,000 | 50,000 | 100 | 735,000 April 1886 .10 |
| 14 | Best & Belcher, G. S. | Nev. | 10,080,000 | 100,800 | 100 | 2,279,275 Aug. 1890 .25 |
| 15 | Big Pittsburg, S. L. | Colo. | 20,000,000 | 200,000 | 100 | * |
| 16 | Black Oak, s. | Cal. | 3,000,000 | 300,000 | 10 | * |
| 17 | Boston Con., G. | Cal. | 10,000,000 | 100,000 | 100 | 170,000 Nov. 1883 .25 |
| 18 | Bremen, s. | N. M. | 5,000,000 | 500,000 | 10 | * |
| 19 | Brownlow, s. | Colo. | 250,000 | 250,000 | 1 | |
| 20 | Brunswick, G. | Cal. | 2,000,000 | 400,000 | 5 | * |
| 21 | Bullion, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 2,790,000 Dec. 1889 .25 |
| 22 | Calaveras, G. | Cal. | 500,000 | 500,000 | 1 | * |
| 23 | Carisa, G. | Wy. | 500,000 | 100,000 | 5 | * |
| 24 | Carupano, G. S. L. C. | Ven. | 200,000 | 100,000 | 2 | * |
| 25 | Cashier, G. S. | Colo. | 500,000 | 250,000 | 2 | * |
| 26 | Charles Dickens, G. S. | Idaho | 1,250,000 | 250,000 | 5 | * |
| 27 | Cherokee, G. | Cal. | 1,500,000 | 150,000 | 10 | |
| 28 | Cleiland, s. | Nev. | 11,200,000 | 112,000 | 100 | 1,540,000 Nov. 1889 .50 |
| 29 | Cleveland, T. | Dak. | 1,000,000 | 500,000 | 2 | * |
| 30 | Coichis. | N. M. | 500,000 | 50,000 | 10 | |
| 31 | Comstock, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 35,000 Mar. 1887 .15 |
| 32 | Con. Imperial, G. S. | Nev. | 5,000,000 | 50,000 | 100 | 1,875,000 July 1890 .05 |
| 33 | Con. Pacific, G. | Cal. | 6,000,000 | 60,000 | 100 | 198,000 June 1890 .10 |
| 34 | Con. Silver, s. | Mo. | 2,500,000 | 250,000 | 10 | * |
| 35 | Crescent, S. | Colo. | 3,000,000 | 300,000 | 10 | * |
| 36 | Crocker, s. | Ariz. | 10,000,000 | 100,000 | 100 | 150,000 June 1890 .15 |
| 37 | Crowell, G. | N. C. | 500,000 | 500,000 | 1 | |
| 38 | Dahlonega, G. | Ga. | 250,000 | 250,000 | 1 | * |
| 39 | Dandy, s. | Colo. | 5,000,000 | 500,000 | 10 | |
| 40 | Decatur, G. | Colo. | 1,500,000 | 300,000 | 5 | * |
| 41 | Denver City, S. L. | Colo. | 5,000,000 | 500,000 | 10 | * |
| 42 | Denver Gold, G. | Colo. | 300,000 | 60,000 | 5 | |
| 43 | Durango, G. | Colo. | 500,000 | 500,000 | 1 | * |
| 44 | Eastern Dev. Co., Lt. | N. S. | 1,500,000 | 150,000 | 10 | 990,000 Mar. 1886 1.00 |
| 45 | El Cristo, G. S. | U.S.C. | 1,000,000 | 500,000 | 2 | * |
| 46 | El Dorado, G. | Cal. | 1,000,000 | 250,000 | 4 | * |
| 47 | El Talento, G. | U.S.C. | 1,000,000 | 500,000 | 2 | * |
| 48 | Empire, S. | Utah | 10,000,000 | 100,000 | 100 | |
| 49 | Eureka Tunnel, S. L. | Nev. | 10,000,000 | 100,000 | 100 | * |
| 50 | Exchequer. | Nev. | 10,000,000 | 100,000 | 100 | 865,000 July 1890 .25 |
| 51 | Found Treasure, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 81,500 May 1890 .25 |
| 52 | Gogebic I. Syn., I. | Wis. | 5,000,000 | 200,000 | 25 | * |
| 53 | Gold Cup, S. | Colo. | 500,000 | 500,000 | 1 | * |
| 54 | Golden Era, S. | Mont. | 2,000,000 | 200,000 | 10 | * |
| 55 | Gold Placer, G. | Colo. | 5,000,000 | 200,000 | 25 | 229,314 Dec. 1885 .25 |
| 56 | Gold Rock, G. | Cal. | 1,000,000 | 500,000 | 2 | * |
| 57 | Goodshaw, G. | Cal. | 10,000,000 | 100,000 | 100 | * |
| 58 | Grand Belt, C. | Tex. | 12,000,000 | 120,000 | 100 | |
| 59 | Grand Duke, G. | Colo. | 800,000 | 80,000 | 10 | |
| 60 | Great Remance, G. | U.S.C. | 1,000,000 | 500,000 | 2 | * |
| 61 | Gregory-Bobtail, G. | Colo. | 550,000 | 550,000 | 1 | * |
| 62 | Gregory Con., G. | Mont. | 3,000,000 | 300,000 | 10 | |
| 63 | Hariem M. & M. Co., G. | Cal. | 1,000,000 | 200,000 | 5 | |
| 64 | Head Cent. & Tr., S. G. | Ariz. | 10,000,000 | 100,000 | 100 | |
| 65 | Hector, S. | Cal. | 1,500,000 | 300,000 | 5 | 45,000 Jan. 1889 .15 |
| 66 | Highland, C. | Mich. | 500,000 | 25,000 | 20 | |
| 67 | Holywood. | Cal. | 200,000 | 100,000 | 2 | |
| 68 | Hortense, S. | Colo. | 2,000,000 | 200,000 | 10 | |
| 69 | Huron, C. | Mich. | 1,000,000 | 40,000 | 25 | 280,000 May 1887 3.00 |
| 70 | Iron, Gold & Silver, S. | N. M. | 2,000,000 | 200,000 | 10 | * |
| 71 | Ironton, I. | Wis. | 1,000,000 | 40,000 | 25 | |
| 72 | Iroquois, C. | Mich. | 1,250,000 | 50,000 | 25 | |
| 73 | J. D. Reymert. | Ariz. | 10,000,000 | 100,000 | 100 | |
| 74 | Julia Con., G. S. | Nev. | 11,000,000 | 110,000 | 100 | 1,463,000 Jan. 1889 .10 |
| 75 | Lacrosse, G. | Colo. | 1,000,000 | 100,000 | 10 | * |
| 76 | Lee Basin, S. L. | Colo. | 5,000,000 | 500,000 | 10 | * |
| 77 | Mayflower Gravel. | Cal. | 1,000,000 | 100,000 | 10 | 585,000 Mar. 1890 .56 |
| 78 | Medora, G. | Dak. | 250,000 | 250,000 | 1 | |
| 79 | Mexican, G. S. | Nev. | 10,000,000 | 100,000 | 100 | 2,791,960 Oct. 1890 .25 |
| 80 | Middle Bar, G. | Cal. | 400,000 | 200,000 | 2 | * |
| 81 | Mike & Starr, S. L. | Colo. | 1,000,000 | 200,000 | 5 | * |
| 82 | Mollie Gibson. | Colo. | 2,000,000 | 100,000 | 2 | * |
| 83 | Monitor, G. | Colo. | 100,000 | 1,000,000 | 1 | * |
| 84 | Mutual Mg. & Sm. | W'sh. | 100,000 | 100,000 | 1 | * |
| 85 | Native, C. | Mich. | 1,000,000 | 40,000 | 25 | |
| 86 | Neath, G. | Colo. | 1,000,000 | 100,000 | 10 | |
| 87 | Nevada Queen, S. | Nev. | 10,000,000 | 100,000 | 100 | 200,000 Oct. 1889 .25 |
| 88 | New Germany, G. | N. S. | 100,000 | 100,000 | 1 | * |
| 89 | New Pittsburg, S. L. | Colo. | 2,000,000 | 200,000 | 10 | * |
| 90 | N. Commonw'lth, S. | Nev. | 10,000,000 | 100,000 | 100 | 85,000 April 1890 .25 |
| 91 | North Standard, G. | Cal. | 10,000,000 | 100,000 | 100 | 20,000 Nov |
| 92 | Noonday. | Cal. | 600,000 | 60,000 | 10 | 208,000 Dec. 1881 .10 |
| 93 | Oneida Chief, G. | Cal. | 500,000 | 125,000 | 100 | * |
| 94 | Oriental & Miller, S. | Nev. | 10,000,000 | 400,000 | 25 | |
| 95 | Osceola, G. | Nev. | 5,000,000 | 500,000 | 10 | * |
| 96 | Overman, G. S. | Nev. | 11,520,000 | 115,200 | 100 | 3,832,800 Dec. 1889 .25 |
| 97 | Park, S. | Utah | 2,000,000 | 200,000 | 10 | |
| 98 | Peer, S. | Ariz. | 10,000,000 | 100,000 | 100 | 165,000 Aug. 1890 .10 |
| 99 | Peerless, S. | Ariz. | 10,000,000 | 100,000 | 100 | 405,000 Aug. 1890 .15 |
| 100 | Phœnix. | Ariz. | 500,000 | 500,000 | 1 | * |
| 101 | Phœnix, G. S. | Ark. | 5,000,000 | 200,000 | 25 | * |
| 102 | Phœnix Lead, S. L. | Colo. | 100,000 | 100,000 | 1 | * |
| 103 | Pilgrim, G. | Cal. | 600,000 | 300,000 | 2 | * |
| 104 | Potosi, S. | Nev. | 11,200,000 | 112,000 | 100 | 1,573,000 Mar. 1890 .50 |
| 105 | Proustite, S. | Idaho | 250,000 | 250,000 | 1 | * |
| 106 | Puritan, S. G. | Colo. | 1,500,000 | 150,000 | 10 | * |
| 107 | Quincy. | Colo. | 3,000,000 | 300,000 | 10 | |
| 108 | Rappahannock, G. S. | Va. | 250,000 | 250,000 | 1 | * |
| 109 | Red Elephant, S. | Colo. | 500,000 | 500,000 | 1 | * |
| 110 | Ropes, G. S. | Mich. | 2,000,000 | 80,000 | 25 | 147,200 July 1887 .50 |
| 111 | Russell, G. | N. C. | 1,500,000 | 300,000 | 5 | |
| 112 | Sampson, G. S. L. | Utah | 10,000,000 | 100,000 | 100 | 288,157 July 1888 1.08 |
| 113 | San Sebastian, G. | San S. | 1,600,000 | 320,000 | 5 | * |
| 114 | Santa Fe, C. | N. M. | 5,000,000 | 500,000 | 10 | |
| 115 | Santiago, G. | U.S.C. | 400,000 | 200,000 | 2 | * |
| 116 | Security, S. | Colo. | 10,000,000 | 1,000,000 | 10 | |
| 117 | Sheridan. | N. M. | 2,000,000 | 200,000 | 10 | |
| 118 | Silver Queen, C. | Ariz. | 5,000,000 | 200,000 | 25 | * |
| 119 | South Bulwer, G. | Cal. | 10,000,000 | 100,000 | 100 | 100,000 May 1881 .25 |
| 120 | South Rite. | Cal. | 10,000,000 | 100,000 | 100 | 195,000 Jan. 1888 .05 |
| 121 | South Pacific. | Cal. | 500,000 | 100,000 | 5 | |
| 122 | Stanislaus, G. | Cal. | 2,000,000 | 200,000 | 10 | |
| 123 | St. Kevin, G. S. | Colo. | 100,000 | 100,000 | 1 | * |
| 124 | St. Louis & Mex., S. | Mex. | 5,000,000 | 500,000 | 10 | * |
| 125 | St. Louis & St. Elmo. | Colo. | 2,000,000 

# NEW YORK MINING STOCKS QUOTATIONS.

## DIVIDEND-PAYING MINES.

| Name and Location of Company. | Nov. 15. H. | Nov. 15. L. | Nov. 17. H. | Nov. 17. L. | Nov. 18. H. | Nov. 18. L. | Nov. 19. H. | Nov. 19. L. | Nov. 20. H. | Nov. 20. L. | Nov. 21. H. | Nov. 21. L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alice | 2.15 | | | | | | | | | | | | 100 |
| Argenta | .16 | | | | | | | | | | | | 300 |
| Atlantic, Mich | | | | | | | 16.25 | | | | | | 100 |
| Belcher, Nev | | | | | | | | | | | | | |
| Belle Isle | .87 | | | | .70 | | | | | | | | 300 |
| Bodie Cons., Cal | 1.30 | | | | .75 | | | | | | | | 350 |
| Bos. & Mont., Mont | | | | | | | | | | | 43.25 | | 50 |
| Breece, Colo | | | | | | | | | | | | | |
| Bulwer, Cal | .39 | | | | .25 | | | | | | | | 300 |
| Caledonia | | | .75 | | | | .75 | | | | | | 900 |
| Calumet & Hecla, Mich | | | | | | | 250¾ | | | | | | 10 |
| Catalpa, Colo | | | | | | | | | | | | | |
| Chrysolite, Colo | | | | | | | | | | | | | |
| Confidence, Nev | | | | | | | | | | | | | |
| Cons. Cal. & Va., Nev | 3.80 | | | | 3.65 | 3.30 | 3.45 | | 3.50 | | 3.30 | | 900 |
| Crown Point, Nev | | | | | | | | | | | 1.80 | | 100 |
| Deadwood, Dak | | | | | | | | | | | | | |
| Dunkin, Colo | | | | | | | | | | | | | |
| Eureka Con | | | | | 4.10 | | | | | | | | 100 |
| Father de Smet, Dak | | | | | | | | | | | | | |
| Franklin | | | | | | | 16.50 | | | | | | 100 |
| Freeland, Colo | | | | | | | | | | | | | |
| Gould & Curry, Nev | | | | | | | 1.80 | | 1.80 | | 1.80 | | 300 |
| Hale & Norcross, Nev | 2.25 | | | | | | 3.15 | | | | | | 200 |
| Holyoke | | | | | .08 | | | | | | | | 200 |
| Homestake, Dak | 9.00 | | | | | | 8.50 | | | | | | 200 |
| Horn-Silver, Utah | 3.25 | | 3.00 | | 3.00 | | 3.05 | | | | 3.15 | | 800 |
| Independence, Nev | | | | | | | | | | | | | |
| Iron Hill, Dak | | | | | | | | | | | | | |
| Kearsarge | | | | | | | | | | | | | |
| Leadville C., Colo | | | .16 | .15 | | | | | | | | | 2,800 |
| Little Chief, Colo | .40 | | .35 | | .35 | | | | .38 | | | | 1,600 |
| Mono, Cal | .65 | | | | .50 | | | | | | | | 300 |
| Moulton, Mont | | | | | .35 | | | | | | | | 200 |
| Mt. Diablo, Nev | | | | | | | | | | | | | |
| Navajo, Nev | | | 1.30 | | | | | | | | | | 100 |
| N. Belle Isle, Nev | | | | | | | | | 1.25 | | | | 100 |
| Ontario, Utah | 42.50 | 40.50 | 41.00 | 40.00 | 40.00 | | | | 40.75 | 40.25 | | | 640 |
| Ophir, Nev | | | | | 3.70 | | 4.00 | | 3.75 | | | | 300 |
| Osceola, Mich | | | | | | | | | | | 33.13 | | 20 |
| Plymouth, Cal | | | | | | | | | 1.50 | | 1.50 | | 450 |
| Quicksilver, Pref | | | | | | | | | 37.00 | | 37.00 | | 200 |
| " Com | | | | | | | | | | | | | |
| Quincy, Mich | | | | | | | 90.38 | | | | | | 50 |
| Robinson Cons., Colo | | | | | | | | | | | | | |
| Savage | 2.45 | | 2.50 | | | | 2.20 | | | | | | 400 |
| Sierra Nevada, Nev | | | | | 2.15 | | | | 2.15 | 2.00 | | | 800 |
| Silver Cord | | | | | | | | | | | | | |
| Silver King, Ariz | .38 | | | | | | | | | | .35 | | 500 |
| Silver Mg. of L. V | | | | | | | | | | | | | |
| Small Hopes | | | | | | | | | | | | | |
| Standard | | | | | | | | | | | 1.15 | | 200 |
| Stormont, Utah | | | | | | | | | | | | | |
| Tamarack, Mich | | | | | | | | | | | | | |
| Yellow Jacket, Nev | | | | | 2.30 | | 2.25 | | 2.20 | | | | 300 |

## NON-DIVIDEND-PAYING MINES.

| Name and Location of Company. | Nov. 15. H. | Nov. 15. L. | Nov. 17. H. | Nov. 17. L. | Nov. 18. H. | Nov. 18. L. | Nov. 19. H. | Nov. 19. L. | Nov. 20. H. | Nov. 20. L. | Nov. 21. H. | Nov. 21. L. | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alpha, Nev | | | | | | | | | | | | | |
| Alta, Nev | | | | | | | | | 1.10 | | 1.10 | 1.05 | 600 |
| American Flag, Colo | | | | | | | | | | | | | |
| Andes, Nev | | | 2.00 | | | | | | | | | | 100 |
| Amador, Cal | | | | | | | | | | | | | |
| Astoria, Cal | .06 | .06 | .06 | | | | | | | | .07 | .06 | 4,600 |
| Barcelona, Nev | | | | | | | | | | | | | |
| Best & Belcher, Nev | | | | | | | | | | | | 2.50 | 200 |
| Bonanza King, Cal | | | | | | | | | | | | | |
| Brunswick, Cal | | .07 | | .08 | .07 | .09 | .08 | .10 | .08 | .12 | .10 | | 15,600 |
| Bullion, Nev | | | | | | | | | | | | | |
| Butte & Bost., Mont | | | | | | | | | | | | | |
| Castle Creek, Idaho | | | | | | | | | | | | | |
| Challar, Nev | | 3.70 | | | | | | | 3.55 | | 3.50 | 3.50 | 400 |
| Col. & Beaver, Idaho | | | | | | | | | | | | | |
| Commonwealth, Nev | | | | | | | | | | | | | |
| Comstock T., Nev | | | | | | | | | | | | | |
| " bonds | | | | | | | | | | | | | |
| " scrip | | | | | | | | | | | | .29 | 100 |
| Con. Imperial, Nev | | | | | | | | | | | | | |
| Cons. Pacific, Cal | | | | | | | | | | | | | |
| Crescent, Colo | | | | | | | | | | | | | |
| Denver City, Colo | | | | | | | | | | | | | |
| El Cristo, Rep. of Col | | | | | | | | | | | | | |
| Exchequer | | | | | | | | | | | | | |
| Hollywood, Cal | | | | | | | | | | | | | |
| Huron, Mich | | | | | | | | | | | | 3.88 | 100 |
| Julia, Nev | .37 | .37 | | | | | | | .40 | | .40 | .39 | 1,700 |
| Justice, Nev | | | | | | | | | | | | | |
| Kossuth | .12 | .12 | | | | | | | | | | | 600 |
| Lacrosse, Colo | | | | | | | | | | | | | |
| Lee Basin, Colo | | | | | | | | | | | | | |
| Mexican, Nev | 2.65 | 2.50 | | | | | | | 2.50 | | 2.55 | 3.50 | 500 |
| Monitor | | .03 | | | | | | | | | .04 | | 1,200 |
| Mutual Sm. & Mg. Co | 1.50 | 1.50 | | | 1.50 | | | | | | 1.50 | 1.50 | 700 |
| Nevada Queen, Nev | | | | | | | | | | | | | |
| N. Commonwealth, Nev | | | | | | | | | | | | | |
| Occidental, Nev | | 1.25 | | | 1.25 | | | | | | | 1.00 | 500 |
| Oriental & Mil., Nev | | | | | | | | | | | | | |
| Overman, Nev | | | | | | | | | | | | | |
| Phœnix of Ariz | | | | | | | | | .68 | .48 | .68 | .56 | .75 | .65 | 9,600 |
| Phœnix Lead, Colo | | | | | | | | | | | | | |
| Potosi | | | | | | | | | | | 7.00 | | 50 |
| Rappahannock, Va | | | | | | | | | | | | | |
| Santa Fe, Colo | | | | | | | | | | | | | |
| S. Sebastian | | | | | | | | | | | | | |
| Scorpion | | | | | | | | | | | | | |
| Silver Hill | | | | | | | | | | | | | |
| Silver Queen | | | | | | | | | | | | | |
| Sullivan Con., Dak | | | | | | | | | | | | | |
| Sutro Tunnel, Nev | | | | | | | | | | | | | |
| Sutter Creek, Cal | 1.15 | 1.15 | | | | | | | 1.15 | | 1.15 | 1.15 | 800 |
| Tioga, Cal | | | | | | | | | .10 | | | | 200 |
| Union Cons., Nev | 2.45 | | | | | | | | 2.00 | | 2.35 | 2.00 | 1,000 |
| Utah, Nev | | | | | | | | | .70 | | .80 | .80 | 80 |

* Ex. dividend. † Dealt in at the New York Stock Ex. Unlisted securities. ‡ Assessment paid. § Assessment unpaid. Dividend shares sold, 14,350. Non-dividend shares sold, 39,350. Total, New York, 53,700.

# BOSTON MINING STOCK QUOTATIONS.

| Name of Company. | Nov. 14. | | Nov. 15. | | Nov. 17. | | Nov. 18. | | Nov. 19. | | Nov. 20. | | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Atlantic, Mich | 17.50 | 17.00 | 16.13 | 16.00 | 16.50 | 16.13 | 16.50 | 16.00 | 16.25 | 15.75 | 17.00 | 16.00 | 1,995 |
| Bodie, Cal | | | | | | | | | | | | | |
| Bonanza Development | | | .50 | | .53 | | .50 | | | | | | 900 |
| Bost. & Mont., Mont | 47.25 | 46.00 | 46.00 | 43.25 | 44.00 | 43.00 | 44.00 | 41.00 | 41.00 | 38.50 | 42.75 | 41.00 | 8,577 |
| Breece, Colo | | | | | | | | | | | | | |
| Calumet & Hecla, Mich | 278 | 270 | 266 | 260 | 265 | 259 | 263 | 259 | 260 | 258 | 265 | 261 | 721 |
| Catalpa, Colo | | | | | | | | | | | | | |
| Central, Mich | | | | | | | | | | | | | |
| Chrysolite Colo | | | | | | | | | | | | | |
| Con. Cal. & Va., Nev | | | | | | | | | | | | | |
| Dunkin, Colo | .70 | | | | .65 | | | | | | | | 250 |
| Eureka, Nev | | | | | | | | | | | | | |
| Franklin, Mich | 17.75 | 17.00 | 17.00 | 16.00 | 17.00 | 16.00 | 16.00 | | 16.50 | | 17.00 | 16.00 | 2,313 |
| Honorine, Utah | | | | | | | | | | | | | |
| Horn Silver, Utah | | | | | | | | | | | | | |
| Kearsarge | 14.00 | 13.00 | 13.00 | 12.75 | 13.00 | | 13.00 | | 13.00 | 11.50 | 13.00 | | 1,220 |
| Little Chief, Colo | | | | | | | | | | | | | |
| Little Pittsburg, Colo | | | | | | | | | | | | | |
| Moulton | | | | | | | | | | | | | |
| Napa, Cal | | | | | | | | | | | | | |
| Ontario, Utah | | | | | | | | | | | | | |
| Osceola, Mich | 36.50 | 34.50 | 35.00 | 32.75 | 33.00 | 32.00 | 33.00 | 31.38 | 31.00 | 30.00 | 32.25 | 30.75 | 4,075 |
| Pewabic, Mich | | | | | | | | | | | | | |
| Quincy, Mich | 95.00 | 91.00 | 90.00 | | 90.00 | 85.00 | 90.00 | | 85.00 | | 85.00 | | 235 |
| Ridge, Mich | | | | | | | | | | | | | |
| Sierra Nevada, Nev | | | | | | | | | | | | | |
| Silver King | | | | | | | | | | | | | |
| Stormont, Utah | | | | | | | | | | | | | |
| Tamarack, Mich | 161 | 160 | 160 | | 160 | | 160 | 155 | 152 | 150 | 160 | 159 | 388 |
| Tecumseh, Mich | | | | | | | 1.75 | 1.50 | 1.50 | | 1.50 | | 425 |

| Name of Company. | Nov. 14. | | Nov. 15. | | Nov. 17. | | Nov. 18. | | Nov. 19. | | Nov. 20. | | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allouez, Mich | 5.25 | 5.00 | 5.00 | 4.50 | 5.00 | 4.75 | | | 5.00 | 4.50 | 4.88 | | 1,637 |
| Arnold, Mich | | | | | | | | | | | | | |
| Aztec, Mich | | | | | | | | | | | | | |
| Brunswick, Cal | | | | | | | | | | | | | |
| Butte & Boston, Mont | 16.00 | 15.00 | 15.00 | 14.00 | 15.00 | 14.00 | 14.50 | 13.00 | 14.00 | 11.00 | 14.50 | 14.00 | 1,771 |
| Centennial, Mich | 16.00 | 15.50 | 16.00 | 15.00 | 14.50 | 14.00 | 14.50 | 14.00 | | | 15.00 | 14.00 | 782 |
| Comstock, T., Nev | | | | | | | | | | | | | |
| Copper Falls Mg | | | | | | | | | | | | | |
| Crescent, Colo | | | | | .10 | | | | | | | | 600 |
| Dana, Mich | | | | | | | | | | | | | |
| Don Enrique, N. M | | | | | | | | | | | | | |
| El Cristo, S. A | | | | | | | | | | | | | |
| Hanover, Mich | | | | | | | | | | | | | |
| Humboldt, Mich | | | | | | | | | | | | | |
| Hungarian, Mich | | | | | | | | | | | | | |
| Huron, Mich | | | | | | | | | | | | 3.50 | 100 |
| Mesnard, Mich | | | | | | | | | | | | | |
| National, Mich | | | | | 1.50 | | 1.50 | | | | | 1.50 | 350 |
| Native, Mich | | | | | .16 | | | | | | | | 600 |
| Oriental & M., Nev | | | | | | | | | | | | | |
| Phœnix | | | | | | | | | | | | | |
| Pontiac | | | | | | | | | | | | | |
| Rappahannock, Va | | | | | | | | | | | | | |
| Santa Fe, N. Mex | .50 | .43 | .40 | | .40 | | .38 | | .40 | .38 | .40 | | 5,250 |
| Shoshone, Idaho | | | | | | | | | | | | | |
| South Side, Mich | | | | | | | | | | | | | |
| Star | | | | | | | | | | | | | |
| Washington, Mich | | | | | | | | | | | | | |
| Winthrop, Mich | | | | | | | | | | | | | |

Boston: Dividend shares sold, 21,059. Non-dividend shares sold, 11,090. Total Boston, 32,149.

# COAL STOCKS.

| Name of Company. | Par val. of shares. | Nov. 15. H. | Nov. 15. L. | Nov. 17. H. | Nov. 17. L. | Nov. 18. H. | Nov. 18. L. | Nov. 19. H. | Nov. 19. L. | Nov. 20. H. | Nov. 20. L. | Nov. 21. H. | Nov. 21. L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| American Coal | | | | | | | | | | | | | | |
| Cambria Iron | | | | | | | | | | | | | | |
| Cameron Coal & I.Co | | | | | | | | | | | | | | |
| Ches. & O. RR | 100 | | | | | | | | | | | | | |
| Chic. & Ind. Coal RR | 100 | | | | | | | | | | | | | |
| Do. pref | 100 | | | | | | | | | | | | | |
| Col. C. & I | 100 | 33⅞ | 32 | 34½ | 32 | 33¾ | 30¾ | 33½ | 30 | 35 | 33½ | 37 | 34½ | 15,565 |
| Col. & Hocking C. I. | 100 | | | 17 | 16⅛ | 18 | 16 | 17 | | | | | | 1,170 |
| Consolidation Coal | 100 | | | | | | | | | | | | | |
| Del. & H. C | 100 | | | 130⅛ | 128¼ | 131 | 128½ | 131 | 128 | 131¾ | 130¾ | 131 | 130½ | 2,389 |
| D., L. & W. RR | 50 | 132½ | 123½ | 130 | 124 | 131 | 127 | 130½ | 127½ | 131⅜ | 130 | 133½ | 130⅜ | 135,922 |
| Hocking Valley | 100 | 23¼ | | 24½ | 22 | 23½ | 23 | 24 | 21½ | 23¾ | 23 | 25½ | 24¼ | 5,405 |
| Hunt. & Broad Top | | 20 | | 19¾ | | | | | | | | | | 144 |
| Do. pref | | 45¼ | 45 | 44⅝ | 44½ | 44¾ | 44½ | 44½ | 44 | 44⅞ | 44 | | | 1,188 |
| Illinois C & Coke Co | | | | | | | | | | | | | | |
| Lehigh C. & N | 50 | 50 | 49 | 49 | 46½ | 48 | 47½ | 47⅝ | 46⅛ | 47 | 44⅞ | | | 7,971 |
| Lehigh Valley RR | 50 | 49¾ | 49 | 49 | 48½ | 49 | 48¾ | 48⅝ | 48⅛ | 49 | 48½ | | | 5,935 |
| Lehigh & Wilk. Coal | 100 | | | | | | | 15 | | | | | | 200 |
| Mahoning Coal | 100 | | | | | | | | | | | | | |
| Do. pref | 100 | | | | | | | | | 112 | 110 | | | 180 |
| Maryland Coal | | 15 | | | | 16 | | | | 15 | | | | 450 |
| Morris & Essex | 100 | 149 | 147½ | | | | | 145 | | | | | | 334 |
| New Central Coal | 50 | | | | | 9 | | | | | | | | 100 |
| N. J. C. RR | 100 | 101½ | 98 | 101½ | 99 | 100⅜ | 92 | 100 | 90 | 100¼ | 97 | 102⅛ | 99⅞ | 14,454 |
| N. Y. & S. Coal | 100 | | | | | | | | | | | | | |
| N. Y., Susq. & West | 100 | 6½ | 5¾ | 6½ | 6 | 6¼ | | 7 | 6⅜ | | | 6½ | | 2,515 |
| Do. pref | 100 | 23 | | 23 | 21 | 23 | 21½ | 23 | 21 | 23⅝ | 23 | 24¾ | 23⅝ | 3,435 |
| N.Y. & Perry C. & I | 100 | | | | | | | | | | | 11 | 10 | 400 |
| Norfolk & West. RR. | 50 | 15 | 14 | | | | | 15 | 12⅜ | 14⅝ | 14 | 16 | | 794 |
| Do. pref | 50 | 52 | 50½ | 52⅝ | 52 | 51⅞ | 51⅛ | 49½ | 48 | 51 | 50 | | | 2,970 |
| Penn. Coal | 50 | | | | | | | | | | | | | |
| Penn. RR | 50 | 49¾ | 47¾ | 49 | 48¼ | 49 | 48 | 48¼ | 47⅜ | 48⅞ | 48 | | | 25,341 |
| Ph. & R. RR | | 30¼ | 28¼ | 30 | 28⅛ | 30⅞ | 29½ | 30¼ | 28⅛ | 30½ | 28¾ | 31¾ | 29¼ | **160,917 |
| Sunday Creek Coal | | | | | | | | | | | | | | |
| Do. pref | 100 | | | | | | | | | | | | | |
| Tennessee C. & I. Co | | 32 | 30 | 32¼ | 30⅛ | 31 | 30 | 31 | 28 | 32 | 30 | 32¾ | 31 | 18,140 |
| Do. pref | | 74 | 73 | 71⅛ | | 76 | 75 | 80 | 77 | 81 | | 74 | | 1,000 |
| Westmoreland Coal | | | | | | | | | | | | | | |

**Sales in New York, 80,400; in Philadelphia, 80,517. Total sales, 406,919.

## San Francisco Mining Stock Quotations.

| Company. | Closing Quotations. Nov. 14. | Nov. 15. | Nov. 17. | Nov. 18. | Nov. 19. | Nov. 20. |
|---|---|---|---|---|---|---|
| Alpha | | | | | | |
| Alta | 1.10 | 1.15 | .95 | .95 | 1.00 | .95 |
| Belcher | | | | | | |
| Belle Isle | .80 | .80 | .75 | .75 | .75 | .75 |
| Best & Bel | 2.75 | 2.60 | 2.40 | 2.40 | 2.40 | 2.40 |
| Bodie | 1.15 | .90 | .65 | .70 | .80 | .80 |
| Bulwer | .30 | .30 | .20 | .20 | .20 | .20 |
| Challar | 3.70 | 3.75 | 3.40 | 3.45 | 3.40 | 3.45 |
| Com'wealth | 2.70 | 2.80 | | 2.25 | | 2.25 |
| Con. C. & V | 3.75 | 3.80 | 3.60 | 3.55 | 3.60 | 3.55 |
| Crown Point | 2.10 | 2.00 | 1.75 | 1.75 | 1.70 | 1.70 |
| D'l Monte, N'v | | | | | | |
| Eureka C | | | 3.60 | 3.75 | 3.75 | 3.75 |
| Gould & C | 2.00 | 1.90 | 1 60 | 1.70 | 1.60 | 1.70 |
| Grand Prize | | | | | | |
| Hale & N | 2.20 | 2.10 | 2.00 | 2.00 | 2.00 | 2.00 |
| M. White | | | | | | |
| Mexican | 2.55 | 2.40 | 2.10 | 2.35 | 2.45 | 2.40 |
| Mono | .60 | .50 | .45 | .40 | .45 | .45 |
| Mt. Diablo | | | | | | |
| Navajo | .35 | .30 | .30 | .30 | .30 | .30 |
| Nev. Queen | .95 | .90 | .80 | .75 | .90 | .90 |
| N. Belle Isle | 1.15 | 1.25 | 1.15 | 1.10 | 1.30 | 1.25 |
| N.Com'w'lth | 1.50 | 1.35 | | | | 1.20 |
| Ophir | 3.80 | 3.85 | 3.50 | 3.75 | 3.65 | 3.60 |
| Potosi | 7 00 | 7.13 | 6.63 | 6 63 | 6.75 | 6.63 |
| Savage | 2.40 | 2.30 | 2.90 | 2.00 | 2.05 | 2.00 |
| Sierra Nev | 2.30 | 2.40 | 1.95 | 2.10 | 2.05 | 2.05 |
| Union Con | 2.25 | 2.25 | 2.05 | 2.05 | 2.05 | 2.10 |
| Utah | .80 | .80 | .65 | .55 | .70 | .70 |
| Yellow Jak | 2.45 | 2.45 | 2.10 | 2.25 | 2.10 | 2.05 |

## STOCK MARKET QUOTATIONS.

### Baltimore, Md.

| COMPANY. | Bid. L. H. | Asked. L. H. |
|---|---|---|
| Atlantic Coal | $ .... | $ .... |
| Balt. & N. C. | .... | .16@.17 |
| Big Vein Coal | .... | .... |
| Conrad Hill | .... | .10 |
| Cons. Coal | .25@.27 | .27 |
| Diamond Tunnel | .... | .... |
| George's Crk. C. | .... | 1.15 |
| Lake Chrome | .... | .... |
| Maryland & Charlotte | .... | .... |
| North State | .... | .... |
| Silver Valley | .60 | .50@.85 |

Prices bid and asked, lowest and highest, during the week ending November 20.

### Birmingham, Ala.

| COMPANY. | Bid. L. H. | Asked. L. H. |
|---|---|---|
| Ala. Coal & I. Co. | .... | $100 |
| Ala. Conn. C. & C. Co. | .... | $23 |
| Ala. R. Mill Co. | $100 | .... |
| *Alice Furnace | $103 | .... |
| Anna Howe G. Mg. Co. | $¼ | .... |
| Bessemer Land | $31 | $34 |
| Bir. Mg. & Mfg. | $20 | $42 |
| Cahaba Coal Mg. Co. | .... | $61 |
| Camille Gold Mg. Co. | $½ | .... |
| De Pardeleben C. & I. Co. | $50 | $56 |
| Decat. L. Imp | $12 | .... |
| Decatur Min. L. | .... | $19 |
| Ensley Land | .... | $9 |
| *Eureka | **$99 | $102½ |
| Florence L. & Mg. Co. | $20 | $21 |
| Gadsen Land | $4 | .... |
| Hecla Coal Co. | $10 | .... |
| Hen. S. & M. Co. | $35 | $50 |
| Jagger-Townl'y C. & C. Co. | $8½ | $10 |
| Mag-Ellen | $100 | .... |
| Mary Lee C. & R. Co. | $25 | .... |
| Sheffield C. & I. Co. | .... | $49¼ |
| Sloss I. & S | .... | $30½@$32 |
| †Sloss I. & S | .... | $92 |
| ‡‡ Sloss I. & S. | .... | $60 |
| Tuscaloose C. I. & L. Co. | $22½ | $24 |
| Ten. C. & I. Co. | $39 | $40 |
| " pref. | .... | $91 |
| Vulcan C. & C. Co | $5 | .... |
| Woodstock I. Co. | .... | $30 |

Prices, highest and lowest, bid and asked during week ending November 17.
* Bonds. † First mortgage. ‡‡ Second mortgage. ** Without interest.

### Pittsburg, Pa. Nov. 12.

| COMPANY. | B. | A. | Closing. |
|---|---|---|---|
| Allegheny Gas Co. | $40.00 | .... | $40.00 |
| Bridgewater Gas Co. | $35.00 | $50.00 | $50.00 |
| Chartiers Val. Gas. | *24.00 | *27.00 | *25.13 |
| Columbia Oil Co. | *2.50 | *3.50 | *3.13 |
| Consolidated Gas Co. | .... | .... | .... |
| East End E. Light Co. | .... | .... | .... |
| East End Gas Co. | .... | .... | .... |
| Forest Oil | .... | .... | .... |
| Hazlewood Oil Co. | 51.00 | .... | 51.00 |
| La Noria Mining | .19 | .20 | .20 |
| Luster Mg. Co. | *19.25 | *23.00 | *22.38 |
| Mansfield C. & C. Co. | .... | .... | .... |
| Manuf'turers Gas Co. | 19.00 | 25.00 | 20.00 |
| Nat. Gas Co. of W. Va | .... | 65.00 | 65.00 |
| N.Y. & Clev. Gas Coal. | 37.00 | @38.00 | 38.00 |
| Ohio Valley Gas. | 19.00 | 26.00 | 25.00 |
| Pennsylvania Gas | .... | 13.75 | 13.75 |
| People's Natural Gas. | .... | .... | .... |
| People's N. G. & P. Co. | *12.50 | *13.50 | *13.00 |
| Philadelphia Co. | *22.00 | *25.13 | *22.75 |
| Pine Run Gas Co. | .... | .... | .... |
| Pittsburg Gas | .... | .... | .... |
| Silverton Mg. Co. | .... | .... | .... |
| South Side Gas. | .... | 25.00 | 25.00 |
| Tuna Oil Co. | .... | .... | .... |
| Union Gas. | .... | .... | .... |
| Washington Oil Co. | .... | .... | .... |
| W'house Brake Co. | .... | 74.00 | 74.00 |
| W'house A. B. Co. | 112.00 | @112.50 | 112.00 |
| W'house E. Light. | 25.00 | 29.00 | 27.75 |
| W'moreland & Camb. | 17.00 | @18.00 | 17.00 |
| Wheeling Gas. | 14.00 | 15.13 | 14.00 |
| Yankee Girl Mg | .... | .... | .... |

Prices bid and asked and sales during week ending Nov. 19:

| | | |
|---|---|---|
| Chartiers Gas. | 125 shs. | $25@$25¼ |
| Columbia Oil Co. | 90 " | @$2¾ |
| Lustre Mining. | 50 " | $20¾@$22¼ |
| People's N.G. & P. Co. | 110 " | @$13 |
| Philadelphia Gas Co. | 683 " | $22¼@$25¾ |
| West. Electric. | 1,480 " | $25¼@$29 |

* Actual selling price.

### St. Louis. Nov. 19.

CLOSING PRICES.

| COMPANY. | Bid. | Asked. |
|---|---|---|
| Adams, Colo. | $1.65 | $1.75 |
| American & Nettie. | .58¾ | .60 |
| Aztec, N. Mex. | .10 | .11 |
| Bi-Metallic | 31.50 | 34.50 |
| Central Silver | .18¾ | .20 |
| Cleveland, Colo. | .02½ | .04 |
| Cleveland & An'r. | .... | .... |
| Cœur d'Alene | .9-¾ | 1.10 |
| Elizabeth | 2.25 | 2.27½ |
| Gold King | .10 | .11 |
| Granite Mountain, Mont. | .... | 45.50 |
| Hope | .... | .... |
| Ingram | .... | .... |
| I. X. L., Colo. | .... | .... |
| La Union | .03¾ | .04 |
| Little Albert | .12 | .16¼ |
| Montrose Placer, Colo. | .48¾ | .51¼ |
| Major Budd, Mont. | .06 | .06½ |
| Mexican Imp. | .... | .15 |
| Mickey Breen. | 1.20 | 1.25 |
| Mountain Key | .45 | .55 |
| Nellie | .... | .... |
| Old Colony | .... | .... |
| Pat Murphy, Colo. | .11 | .12 |
| Puzzle | .... | .... |
| Richmond Hill | .... | .... |
| Samoa | .... | .... |
| Silver Age, Colo. | 2.22½ | 2.35 |
| Small Hopes, Colo. | .87½ | .91¼ |
| Tourtelotte | .... | .... |
| West Granite, Mont. | .... | .... |
| Wire Patch | .11 | .13 |
| Yuma, Ariz. | .50 | .55 |

### Trust Stocks. Nov. 21.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

| CERTIFICATES. | |
|---|---|
| Am. Cotton Oil. Tr. Repts. | $15⅝@$16 |
| Cattle Trust | @ |
| Distillers' & Cattle Feeders'. | 40½@ 41 |
| Linseed Oil | 39 @ 41 |
| National Lead | 16⅞@ 17 |
| Standard Oil | 161 @166 |
| Sugar Refineries, Tr. repts. | 51½@ 56½ |

Sales at the New York Stock Exchange week ending Nov. 21:

| | Sales. | Price H. | Price L. |
|---|---|---|---|
| *American Cotton Oil | 3,545 | 16¾ | 13¾ |
| National Lead | 75.115 | 17 | 14⅞ |
| Sugar | 82,589 | 57½ | 48¾ |

*Trust receipts.

### Foreign Quotations.

| COMPANY. | London. Highest. | Nov. 8. Lowest. |
|---|---|---|
| Almada, Mex. | 1s. 3d. | 9d. |
| Amador, Cal. | £⅛ | £⅜ |
| Appalachian, N. C. | 9d. | 3d. |
| Canadian Phos., Can. | £½ | £¼ |
| Colorado, Colo. | 3s. 9d. | 3s. 3d. |
| Comstock, Utah. | .... | .... |
| Cordova | .... | .... |
| Cons. Esmeralda, Nev. | 4s. | 3s. |
| Denver Gold, Colo. | 6d. | .... |
| Dickens Custer, Idaho. | 1s. 9d. | 1s. 3d. |
| East Arevalo, Idaho. | 2s. | 1s. |
| El Callao, Venezuela. | £2 | £1¾ |
| Elmore, Idaho | 2s. 3d. | 1s. 9d. |
| Garfield, Nev | 1s. 6d. | 6d. |
| Jay Hawk, Mont. | 1s. 6d. | 1s. |
| Josephine, Cal. | 1s. 6d. | 6d. |
| Kohinoor, Colo. | 2s. 3d. | 1s. 9d. |
| La Luz, Mex. | 1s. 6d. | 1s. |
| La Valera, Mex. | 20s. | 15s. |
| Montana Lt., Mont. | 20s. | 12s. |
| New California, Colo. | 6s. 9d. | 6s. 3d. |
| New Consolidated | 5d. | 3d. |
| New Eberhardt, Nev. | 1s. 3d. | 9d. |
| New Emma, S., Utah. | 3s. 3d. | 2s. 9d. |
| Newfoundland, N. F. | 3s. 6d. | 3s. |
| N. Gold Hill, N. C. | 1s. | 6d. |
| New Guston, Colo. | £1 | £3½ |
| New Hoover Hill, N.C. | 1s. | 6d. |
| Old Lout, Colo | £⅛ | £¼ |
| Palmarejo, Mex. | 15s. 6d. | 14s. 6d. |
| Pinos Altos, Mex. | £⅝ | £9-16 |
| Pittsburg Cons., Nev. | 8s. 6d. | 7s. 6d. |
| Richmond Con., Nev. | £1⅝ | £1⅛ |
| Ruby&Dunderb'g, Nev. | 1s. 6d. | 1s. |
| Sam Christian, N. C. | 1s. | 6d. |
| Sierra Buttes, Cal. | 5s. 6d. | 4s. 6d. |
| " Plumas Eur., Cal. | £11-16 | £9-16 |
| Sonora, Mex. | 1s. | 6d. |
| United Mexican, Mex. | 8s. | 7s. |
| U. S. Placer, Colo. | 1s. 3d. | 9d. |
| Viola Lt., Idaho. | 1s. 6d. | 1s. |
| Yankee Girl, Colo. | £1 7-16 | £1 5-16 |

Highest and lowest prices during the week ending November 8.

### Paris. Nov. 6. Francs.

| | |
|---|---|
| Belmez, Spain | 770.00 |
| Callao, Venez | 53.75 |
| Callao Bis., Venez | 6.50 |
| East Oregon, Ore | 4.75 |
| Forest Hill Divide, Cal | 90.00 |
| Golden River, Cal | 225.00 |
| " " parts | 30.00 |
| Lexington, Mont | 120.00 |
| " parts | 3.75 |
| Rio Tinto, Spain | 610.00 |
| Tharsis, Spain | 152.50 |

## CURRENT PRICES.

Those quotations are for wholesale lots in New York.

### CHEMICALS AND MINERALS.

**Acid**—Acetic, ℔ 100 lbs. $1.75@$2.00
Muriatic, 18° ℔ 100 lbs. 1.00@1.50
Muriatic, 20° ℔ 100 lbs. 1.12½@1.75
Muriatic, 22° ℔ 100 lbs. 1.37½@2.00
Nitric, 36° ℔ 100 lbs. 4.00@4.29
Nitric, 42° ℔ 100 lbs. 6.00@6.25
Oxalic, ℔ 100 lbs. 6.50@10.50
Sulphuric, 60° ℔ 100 lbs 80@1.25
Sulphuric, 66° ℔ 100 lbs. 1.00@1.75
**Alkali**—
Refined, 48 p. c. 2¾
Refined, 58° 2¾@3
**Alum**—Lump, ℔ lb. 1¾
Ground, ℔ lb. 1¾@2
Lump ℔ ton, Liverpool £4 17 6
Sulphate of Alumina, ℔ ton £4 10
**Ammonia**—Sul., ℔ 100 lbs. 3.15
Carb, ℔ lb. 7½@8½
**Aqua Ammonia**—18° ℔ lb. 4½
20°, ℔ lb. 6
22°, ℔ lb. 6@7
26°, ℔ lb. 10@11
**Ammoniates**—Azotine, ℔ unit 1 95@ 2 00
Blood, dried, red, ℔ unit, west 1 80@ 1 90
low grade, ℔ unit 1 70@ 1 80
Concentrated tankage, ℔ unit 1 75@ 1 80
Bones, rough, ℔ ton 20 00@23 00
ground, ℔ ton 25 00@28 00
Bone black, refuse, ℔ ton 17 50@19 50
Kieserite 6 00@ 6 50
Fish guano, dried 18 50@19 00
acidulated 10 00@— 00
wet 8 50@ 9 50
Phosphate rock, f. o. b Char'n— —@— —
undried —@ 6 —
dried 7 00@ 7 50
ground 8 00@11 50
Acid phosphate, 14% per unit. 72½@ 75
**Arsenic**—White, powdered ℔ lb. 3¼@3½
Red ℔ lb. 5¾@ 5¾
White at Plymouth, ℔ ton £12 2 6
**Asbestos**—Am., ℔ ton $50@$300
Italian, ℔ ton. c. i. f. L'pool £18@£60
**Ashes**—Pot, 1st sorts, ℔ lb. 4¾@4⅞
Pearl 6¼@6½
**Asphaltum**—P. ton 13.00
Prime Cuban, ℔ lb. 4½@5½c.
Hard Cuban, P ton $28.00
Trinidad, refined, ℔ ton $30.00
Egyptian 8@9
**Barium**—Nitrate, ℔ lb. 8@8½
**Barytes**—Sulph., Am. prime white 17@20
Sulph., foreign, floated, ℔ ton. 19½@21.50
Sulph., off color, ℔ ton 11.50@14.00
Carb., lump, f. o. b. L'pool, ton £6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " 3 15 0
**Bleach**—Over 35 p. c. ℔ lb. 1.80@1.85
**Borax**—Refined, ℔ lb. 9¼@9⅝
Concentrated 7¾@8⅜
Refined " Liverpool ℔ ton £29
**Brimstone**—*See Sulphur.*
**Bromine**—℔ lb. 37@38
**Chalk**—℔ ton 1.75
Precipitated, ℔ lb 4¾@5
**China Clay**—English, ℔ ton 13.50@18.50
Southern, ℔ ton 13.50
**Chrome Yellow**—℔ lb. 10@2
**Cobalt**—Oxide, ℔ lb. 2.60@2.90
**Copper**—Sulph. English Wks. ton £20@£21
**Copperas**—Common, ℔ 100 lbs. 70
Best, ℔ 100 lbs. 75@1.00
Liverpool, ℔ ton, in casks £1 15s.
**Cream of Tartar**—Am. 99% 22½
Powdered, 99 p. c. 23
**Emery**—Grain, ℔ lb. 4½@5
Flour, ℔ lb. 2¾@3½
**Feldspar**—Ground, ℔ ton 15.00
**Fuller's Earth**—Lump, ℔ bbl. 90@95
Powdered, ℔ lb. 1¾@2
**Gypsum**—Calcined, ℔ bbl. 1.25@1.50
**Iodine**—Resublimed 2.75
**Kainit**—℔ ton $9.75@$10
**Kaolin**—*See China Clay.*
**Lead**—Red, ℔ lb. 6¾@9
White, American, in oil, ℔ lb. 6¾@7¼
White, English, ℔ lb. 8½@8¾
Acetate, or sugar of, white 12@13
Nitrate 9@10
**Lime Acetate**—Amer. Brown .95@1.00
" Gray 1.75@1.87½
**Litharge**—Powdered, ℔ lb. 6½@6¾
English flake, ℔ lb. 9@9½
**Magnesite**—Greek, ℔ ton 20.00
**Manganese**—Crude, per unit. 23@28
Oxide, ground, per lb. 2½@6½
**Mercuric Chloride**—(*Corrosive Sublimate*) ℔ lb. 70@72
**Metallic Paint**—Brown per ton. $20@25
Red $20@25
**Mineral Wool**—℔ lb 2
**Mica**—In sheets according to size.
1st quality, ℔ lb. 25@$6.00
**Naphtha**—Black 60
**Ochre**—Yellow, "B. F.," ℔ ton, f. o. b. mill 30.00
"J. F. L. S.," ℔ lb. ex dock 2½
Yellow 10@25
Rochelle 1.35@1.50
Washed Dutch 5@—
Washed French 1½@2½
Washed Nat Oxford, Lump 6½@6¾
Washed Nat Oxford, Powder 7@7½
Golden ¾@4
Domestic ¾@1½
Domestic, for O. C. & W. P. ¾@1
**Oils, Mineral**—
Cylinder, light filtered 15@20
Dark filtered 14@21
Extra cold test —@—
Dark steam refined 10@18
**Phosphate Rock**—S. Carolina, per ton f. o. b. Charleston 6.00@7.25
Ground, ex vessel New York 11.00
Canadian Apatite, lump, f. o. b. at Montreal, ℔ ton 16.00
**Phosphorus**—℔ lb. 64@65
Precip., red 100@102
white 100@103
**Plumbago**—Ceylon, ℔ lb. 4@5
American, ℔ lb. 5@7
**Potassium**—Cyanide, ℔ lb 39@40
Bromide, ℔ lb 33
Chlorate, English, ℔ lb. 11@14
Chlorate, powdered 13@14
Carb, ℔ lb. 4.70@5.54
Caustic, ℔ lb. 7½@8
Iodide 2.65@2.70
Muriate, ℔ 100 lbs. 1.77½@1.82½
Nitrate, refined, ℔ lb. 6@8
Bichromate, ℔ lb. 10½@11
Dble. m'ure salt, basis of 48@50% 1.12@1.20
Sulphate, basis of 90% ℔ 100 lbs. 2.02½
Yellow Prussiate 17½@18
Red Prussiate 42@45
**Pumice Stone**—Select lumps, lb. 3¼
Original cks., ℔ lb. 1¾@2
Powdered, pure, ℔ lb. 2¼@2½
**Pyrites**—Non-cupreous, p. units 10d.
**Quartz**—Ground, ℔ ton 14.00@16.00
**Rotten Stone**—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb. 0@10
**Salt**—Liverpool, ground, ℔ sack 75@80
Turk's Island, ℔ bush 25@28
**Salt Cake**—℔ lb. 70@75
**Saltpeter**—Crude, ℔ lb. 5¼@5½
Refined, ℔ lb. 6@8
**Silex**, ℔ ton 14@25
**Soda**—Carb Ash, 48% 1.60@1.65
" high test 1.55@1.60
Caustic, 48% 1.60
" high test 1.55
Newcastle, 48% — @ —
" high test 1.50@1.55
Bicarb, English 3.50@3.75
" American 3@3½
Crystal, carbonate 1.95@2.00
Caustic, 60% 3.40@5.50
" 70% 3.05@3.10
" 74% 3.05@3.10
" 77% 3.00@3.10
Sal, English 1.17½@1.20
" American 1.10@1.15
Nitrate 1.80
Prussiate 17½@18
Phosphate 7@18
Stannate 8@15
**Strontium**—Nitrate, ℔ lb. 9@9½
**Sulphur**—Roll, ℔ lb. 1¾
Flour, ℔ lb. 20
Crude Brimstone, 2s., ℔ ton 25.50@26.00
Crude Brimstone, 3ds. ℔ ton. 24.75@25.25
**Sylvinit**, 23@27%, S. F. P., per unit. 40@42½
**Talc**—Ground French, ℔ lb. 1¾@1½
Domestic, ℔ ton $18@$20
c. i. f. Liverpool, ℔ ton £4 5
**Terra Alba**—French 80@85
English 75@80
American, No. 1 —@—
American, No. 2 40@50
**Tin**—Crystals 15½@16
Muriate 8@ 3
**Vermillion**—American, ℔ lb. 61
English ℔ lb 82@85
**Vitriol**—(Blue), Ordinary, ℔ lb. 5½@5¾
Extra, ℔ lb. 7
**Zinc Oxide**—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb. 6@6½
Paris, Red Seal, ℔ lb 6½@7
* Spot.

### THE RARER METALS.

**Aluminum**—(Metallic), per lb. $1.50@$2
Sheet, per lb 2.50
**Arsenic**—(Metallic), per lb .40
**Barium**—(Metallic), per gram 4.00
**Bismuth**—(Metallic), per lb. 2 75
**Cadmium**—(Metallic), per lb. 1.00
**Calcium**—(Metallic), per gram 10.00
**Cerium**—(Metallic), per gram. 7.50
**Chromium**—(Metallic), per gram. 1.00
**Cobalt**—(Metallic), per lb. 6.00
**Didymium**—(Metallic), per gram. 9.00
**Erbium**—(Metallic), per gram 7.50
**Gallium**—(Metallic), per gram 140.00
**Glucinum**—(Metallic), per gram 12.00
**Indium**—(Metallic), per gram 9.00
**Iridium**—(Metallic), per oz. 7.00
**Lanthanum**—(Metallic), per gr. 10.00
**Lithium**—(Metallic), per gram 10.00
**Magnesium**—Per lb. 4.50
**Manganese**—(Metallic), per lb. 1.10
Chem. pure, per oz. 10.00
**Molybdenum**—(Metallic), per gm .50
**Niobium**—(Metallic), per gram 5.00
**Osmium**—(Metallic), per oz. 65.00
**Palladium**—(Metallic), per oz. 35.00
**Platinum**—(Metallic), per oz. 15.00
**Potassium**—(Metallic), per lb. 28.00
**Rhodium**—(Metallic), per gram 5.00
**Ruthenium**—(Metallic), per gm. 5.50
**Rubidium**—(Metallic), per gram 2.00
**Selenium**—(Metallic), per oz. 1.80
**Sodium**—(Metallic), per lb. 2.50
**Strontium**—(Metallic), per gm. .60
**Tantalium**—(Metallic), per gram. 9.00
**Telurium**—(Metallic), per lb. 5.00
**Thallium**—(Metallic), per gram .25
**Titanium**—(Metallic), per gram 2.25
**Thorium**—(Metallic), per gram 17.00
**Tungsten**—(Metallic), per oz. 2.25
**Uranium**—(Metallic), per lb. 5.00
**Vanadium**—(Metallic), per gm. 22.00
**Yttrium**—(Metallic), per gram 9.00
**Zirconium**—(Metallic), per oz. 65.00

### BUILDING MATERIAL.

**Bricks**—Pale, ℔ 1,000 3.50@4.00
Jerseys, ℔ 1,000 5.00@5.50
Up Rivers, ℔ 1,000 6.25@6.50
Haverstraw seconds, ℔ 1,000 5.50@6.00
Haverstraw firsts, ℔ 1,000 6.25@7.00
Fronts, nominal, ℔ 1,000
Croton 14.00@16.00
Wilmington 20.00@21.00
Philadelphia @22.00
Trenton @22.00
Baltimore
**Building Stone**—Amherst freestone, ℔ cu. ft. 95@1.00
Brownstone, ℔ cu. ft. 1.00@1.35
Granite, rough, ℔ cu. ft. 45@1.25
Granite, Scotch, ℔ cu. ft. 1.00@1.15
**Cement**—Rosendale, ℔ bbl. 85@1.10
Portland, American, ℔ bbl 2.15@2.45
Portland, foreign, ℔ bbl 2.40@2.50
Portland, " special brands 2.60@2.85
Roman, ℔ bbl. 2.75@2.90
Keene's coarse, ℔ bbl. 4.50@5.50
Keene's fine, ℔ bbl. 7.25@8.50
**Slate**—Purple and green roofing, ℔ 100 ft. 7.00@7.50
Red roofing, ℔ 100 sq. ft. 12.00
Black roofing, ℔ 100 sq. ft. 4.25@5.50
**Lime**—Rockland, common, ℔ bbl. 1.00
Rockland, finishing, ℔ bbl. 1.20
St. John, com. and finish., ℔ bbl. 90@ 95
Glens Falls, com. and fin., ℔ bbl. 85@1.10
**Labor**—Ordinary, ℔ day 1.50@2.00
Masons, ℔ day 4.00
Plasterers, ℔ day 4.00
Carpenters, ℔ day 3.50
Plumbers, ℔ day 3.50
Painters, ℔ day 2.50@3.50
Stonesetters, ℔ day 3.50@4.00
Tilelayers, ℔ day 3.50@4.50
Bricklayers, ℔ day 4.00